Volume One/Number Three/November 1959

1959 Convention Abstracts

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A Journal of The American Speech and Hearing Association

Volume 1. November, 1959 Number 3.

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ASHA is published monthly at the Interstate Printers and Publishers, Inc., Danville, Illinois, by the American Speech and Hearing Association. Subscription: $7.00, single copy $.75. Communications on editorial, business or advertising should be addressed to the Editor, *Asha*, The American Speech and Hearing Association, 1001 Connecticut Ave., N.W., Washington 6, D. C. Address changes should reach the subscription office of The American Speech and Hearing Association by the 1st of the month preceding a change. Subscribers must notify the Post Office they will guarantee forwarding postage for undelivered copies. Other claims for undelivered copies must be made within four months of publication. Second-class postage paid at Danville, Illinois. Printed by The Interstate Printers and Publishers, Inc., 19-27 North Jackson Street, Danville, Illinois. Office of Publication, Jackson at Van Buren, Danville, Illinois.

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Preface

These abstracts represent an attempt to provide ASHA members and other interested individuals with a concise summary of the papers presented at the 35th Annual Convention. It is the first attempt in the history of our organization to present, not only the contributed, but the invited papers in all areas of interest. It is hoped that they will be received as enthusiastically as were the Audiology Abstracts last year.

While there are gaps, the coverage is remarkable inasmuch as procedures were not established and we were working against tight deadlines. It is now planned to make the publication of Abstracts an integral part of each Annual Convention and to publish them in the November Issue of *Asha*. If this plan is to be truly effective, it will require the close cooperation of the membership. Each contributor must assume responsibility for submitting at the time of the official call for papers, an abstract which clearly and succinctly states the 'meat' of his presentation and follows a prescribed editorial style and format.

This will not only insure fuller and more accurate coverage, but will greatly facilitate the Program Committee's difficult task of selecting the papers which can logically be grouped into section meetings keyed to topics of current interest. The same cooperation must be obtained from the invited speakers.

It is hoped that these abstracts will be useful, not only to guide selective attendance at the Convention, but to serve as a reference for some current thinking in the broad field of communication and communicative disorders.

The subcommittee chairmen, William G. Hardy, Duane Spriestersbach and Nancy Wood, assumed the responsibility for editing and compiling these abstracts. In addition to the other members of the Program Committee who helped, we are deeply indebted to the group at the University of Iowa, James F. Curtis, Gene R. Powers, Dorothy Sherman, Frederic Darly, Martin A. Young, and Elizabeth Moodie, who responded with efficiency and good will when the pressures of deadlines were greatest.

Miriam D. Pauls
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Abstracts of the
35th Annual Convention of the
AMERICAN SPEECH AND HEARING ASSOCIATION

November 11 - 14, Cleveland, Ohio

WEDNESDAY, NOVEMBER 11

W 1—STUTTERING: AN INQUIRY ON THERAPY AND THERAPEUTIC APPROACHES.

Participant Oliver Bloodstein, Brooklyn College.—Stuttering at all stages in its development appears to be an anticipatory struggle reaction characterized by tension and fragmentation in speech and reflecting the child's assumption that speech is a difficult process in which it is vitally important to succeed. In the earliest form in which this behavior is observed in the clinic it exhibits the consistency effect and does not seem to differ sharply or qualitatively from stuttering in its more advanced forms. On the other hand, the initial phase of stuttering is not to be differentiated in any absolute way from certain types of normal childhood nonfluency. Most normal young children appear to exhibit, mildly and fleetingly, tensions and fragmentations in speech which reflect the ordinary difficulties which children have in acquiring language and the communicative pressures which are universal in our culture. What comes to be called "stuttering" by parents and speech clinicians in most cases is probably a more severe or chronic form of the same type of anticipatory struggle behavior which may be observed to some degree in the speech of the majority of children. In stuttering, as in most other behavior disorders, there appears to be no sharp line between the normal and the abnormal. The influences which lead to identifiable episodes of anticipatory struggle behavior in children seem to be of essentially three types. First, these children frequently appear to be reacting to certain provocations in the form of delayed speech, articulatory errors, reading difficulties, cluttering, difficulties in phonating, or any other threat of failure which chronically evokes the suggestion that speech is difficult and requires effort and forethought. Second, there is often some reason for exaggerated concern on the part of the child about speaking well, for example parental pressures to live up to excessively high standards of speech, competition with siblings who are more advanced in speech development, excessive praise for unusually good speech, or identification with an adult who has a reputation for superior speech. Third, a child may possess personality traits which make him particularly vulnerable to the pressures and provocations which tend to make for anticipatory struggle behavior. These traits include perfectionism, high aspirations, sensitiveness, dependence, fearfulness, insecurity, and poor tolerance for frustration.

Participant Charles Bluemel, Englewood, Colorado.—The speech therapist is in a unique position, for he has undertaken to deal with the most complex problem in psychiatry, and his task is stupendous. Nevertheless he is doing a better job than the psychiatrist, who has little to offer but the couch. There are many components in the riddle of stuttering:

1. There is a constitutional factor. The stutterer (stammerer) is poorly organized as an individual. He is tense and overreactive. He is sensitive, excitable and easily confused.
2. Because of heredity, he is often born into a neurotic environment in which he is overstimulated and frequently frustrated.
3. The child who is a potential stammerer has a natural nonfluency, a speech deficit. This is a phase of the poor organization already mentioned.
4. Early in life and before the speech function is securely organized, the child encounters disorganizing stress. This may be acute stress in the form of shock, or continuing stress due to environmental factors, usually in the home. The speech, not yet organized, is now disorganized into stammering.
5. Secondary factors soon supervene. These are the speaker's reaction to his speech predicament and his frustration.

(a) In his endeavor to speak, the stammerer holds his breath, exhausts his breath, attempts to speak on inspiration rather than expiration, etc.;

(b) He struggles physically to force the articulation of his words;

(c) He uses "starters" and "wedges" in order to get going;

(d) He uses synonyms and circumlocutions;

(e) He develops aversion and avoidance;

(f) He panics in speech situations;

(g) He becomes conditioned against difficult words, and against difficult people and situations;

(h) He becomes excited and confused in the stress of speech;

(i) He may become morbid, introspective, and obsessive. (With respect to secondary stammering it should be noted that there are not two types of stammering—primary and secondary. Rather there are two phases in the development of stammering. The secondary phase may develop early or late in the course of the speech disorder. Meanwhile the primary phase persists.)

Here we have a complex problem which is not easily encompassed in its entirety. It is a difficult problem for research because of the multiplicity of factors, some relating to the personality and some to the speech. Fortunately the therapy is much more simple than the etiology. The object in therapy is to reorganize the speech; or better still to *organize* the speech in the natural learning period. The ideal therapy situation is that of a mother reading a story to a child from a picture book, with the child quietly repeating the short, well-spoken phrases as the mother reads them. Effective therapy can be carried on in the kindergarten and the early grades in school. While reciting and singing in groups, and while engaging in speech games, the children hear and feel their fluency and thus they organize their speech. The adult stammerer is rarely cured of his speech disorder, though he may acquire a gratifying measure of fluency. The child, however, can learn fluency early in life and can retain it for life. In the broad view, it would seem that the treatment of stammering is still in wrong hands. For a century or more it was in the hands of the quacks. For a few decades it has been in the hands of the colleges and universities. Rightly, however, the problem should move to the level of the kindergarten, where positive results are assured.

Participant Bryng Bryngelson, University of Minnesota.—After a very brief experience with stutterers—say 200 patients—in the early days of my now declining "facing of the inevitable" (I don't mean taxes), I was certain the answers for all time were at hand. Even I had a theory. As time went on and many thousands of patients came my way, I became more and more uncertain and rest today little inclined to propound a theory. Like in my philosophic thinking, one can say I have

no *invisible* means of support—and scientific truth "to me" is a *direction* and not a *destination*. The search, however, into this process reality some of us call "stuttering," I find interesting and challenging, fully aware that as long as the word ends in "ing," it must be a process, ever dynamic, changing and alluring not only to the egotist who would love to have found the answers, but also to others more contented to be doing something about something. Taking care of Time is essential so long as the organisms of talking primates embody an unbuttoned spirit of inquiry—thus stalling off an early disseminated sclerosis. As some of you know, a few years ago I was asked to write a theory for a book, and feeling honored to be numbered among the so-called "Pathologic" elite on the subject of stuttering, I had a dream. It can be referred to as a phylogenetic vision. Its color and distinction lies in the fact that the theory, atavistic, so called—can neither be proved or disproved. When Eve accused Adam, coming into the Garden late one night, of having associated with another woman, he cutely opened his shirt and said "count my ribs." I never hope to be found with a guilty superego about any professional "sins," because my "reveries" could be explained and defended as easily as did Adam, especially by pleading a usufruct with perhaps a touch of serendipity.

Participant I. Peter Glauber, New York City. — I have stated that psychoanalysis regards stuttering broadly as a neurotic disorder in which personality disturbance is in part reflected in disturbance in speech. Other psychoanalysts, however, seeing far fewer stutterers than I do, report that occasionally a patient of theirs might have a stutter but that this disturbance is neither a presenting nor a secondary complaint; it is, indeed, not complained about at all. We refer to such a manifestation not as a symptom but as a character trait. Putting symptom and trait together, we may say that stuttering stems from difficulties arising at various psychic strata. Stuttering most often begins during the early phases of the evolution of the ego, when speech emerges as an expression of it as well as an instrument for its further development. At that stage the ego is differentiating itself from the undifferentiated reservoir of psychic energy from which also stems the id, or the primitive libidinal and aggressive impulses. As a result of fixations at these early levels speech becomes unconsciously equatable with these impulses, with magical attributes of thinking, and especially with archaic symbolic displacements. Furthermore, as speech is a function intermediate between thinking and neuromuscular action, it can substitute for either and for serious disturbances in thinking and action. The pathology of this speech disorder carries reminders of the early phase of its origin, namely, in the more or less typical early methods of adaptation. These include: (a) strong emotional ambivalences; (b) great adhesiveness to early parental images and the transference of these into current life and to early modalities of pleasure and aggression: (c) inhibitions and avoidances in relation to objects and flight from objects; (d) flight tendencies from social situations; (e) correspondingly in the mental sphere there is a strong tendency to adaptation through denial. Two more characteristics are notable. First, alongside flight and avoidance reactions there are primitive attempts at restitution. The second characteristic is that the reactions are total personality reactions rather than merely defenses against particular conflict-producing instinctual expressions. The various aspects here sketched constitute integrated phenomenological data and a theoretical position. The scope of this approach is made possible because it is based on an orientation which includes genetic, dynamic, economic, and topographic aspects.

Participant Wendell Johnson, University of Iowa, Iowa City, Iowa. — The basic position defended was that the problem called stuttering involves an interaction between speaker and listener, and cannot be adequately described or explained by reference to the speaker only. In the usual case it is a listener who first reports the judgment that a problem exists; on the basis of the listener's report it is as a rule to be inferred that at the time when the listener first decided there was a problem the speaker did not share in this judgment. The speaker's feeling that he has a problem comes about as a function of the interaction between him and one or more listeners. Whether a listener decides that the speaker has a speech problem depends primarily upon the listener's judgmental system and incidentally upon the degree of fluency or other observable characteristics of the speaker's communicative behavior. The problem called stuttering, therefore, may be viewed appropriately as essentially a perceptual and evaluational problem, with behavior effects, and is to be distinguished accordingly from the problem of speech nonfluency, *per se*. The problem called stuttering is distinguished by three major variables: (a) the listener's sensitivity to the speaker's nonfluency, (b) the speaker's nonfluency, and (c) the speaker's sensitivity to the listener's reactions to his nonfluency and to his nonfluency, as such. The study of the problem may be fruitfully approached by identifying and investigating the factors functionally related to each of these variables and their significant interactions. Implications of this hypothesis for clinical instruction and counseling was developed as time permitted.

Participant Joseph G. Sheehan, University of California at Los Angeles. — Stuttering is a conflict both of personal role and of interpersonal relationship. Stuttering has its origins in the role uncertainties of the child. Guilt and anxiety over not measuring up to role expectations lie at the roots of stuttering. The ongoing process in the stutterer is understandable as approach-avoidance conflict operating at various levels. The basic aim of therapy is the reduction of avoidance at various levels through an integrated psychotherapy and speech therapy. Current speech therapy contains many unresolved anti-psychotherapeutic features. Since the stutterer does not differ in personality from the general population, for what does he need psychotherapy? He needs both psychotherapy and speech therapy because of the vulnerability of his speech to his emotional states. The stutterer cannot afford to be as maladjusted as the next person; he must handle his problems better. The stutterer can learn to handle feelings without speech upheaval. He can learn to stutter without anxiety and to handle anxiety without his old stuttering. Successive stages of therapy may involve difficult role changes. Guilt which the stutterer builds up during therapy from his self-expectations must be interpreted and handled or the stutterer will drop out. Finally he can become fully integrated in a new role as a normal speaker, once he has become completely a stutterer. Role integration is an essential factor in all recoveries, both within therapy and without it.

W 2—CONTRIBUTED PAPERS IN EXPERIMENTAL PHONETICS I

Effect of Formant Band Width on Vowel Preference. **Arthur S. House, Massachusetts Institute of Technology.** — The subjective importance of the half-power band width of vowel formants was investigated. The stimuli were produced by a resonance-type electrical synthesizer and represented five common vowels of American English with formant center frequencies appropriate to male talkers. Seven variants of each vowel were synthesized; variants differed in their values of formant band width. For a given vowel, the seven samples were paired in all combinations and stored on magnetic tape for presentation to listeners. The listeners were instructed to select the "most natural" item in each pair of stimuli; the vowel in question was always known prior to presentation. The responses of eight listeners were reported and discussed. An attempt was made to relate the results to known characteristics of speech articulation. The research was supported by U. S. Air Force Contract AF 19(604)-2061.

A Principle of Constant Ratio in the Responses to Intelligibility Testing. **John W. Black, The Ohio State University.** —The systematic nature of error responses in intelligibility testing has been exploited in the construction of multiple-choice intelligibility tests. The most frequent error responses have been grouped as decoy items with the stimulus that evoked them. The present study treats the probability of the most frequent error response in relation to the obtained intelligibility of the stimulus; then, the probability of the second most frequent error response; the third, fourth, and fifth. In two sets of data a constant ratio of 5:3 was found between the frequencies with which error responses of adjacent ranks were selected by the listeners. That is, the most frequent error response was selected more often than the second most frequent response by a ratio of 5:3; the second most frequent response was selected more often than the third by the same 5:3 ratio, etc. Implications of the data to the size of the vocabulary that listeners use in responding to a single word in an open matrix were dis-

cussed. This research was conducted under a contract between the Office of Naval Research and The Ohio State University Research Foundation.

Some Solutions of Simplified Models of the Linear Speech Learning Feedback Problem. **Alfred A. Wolf, Stromberg-Carlson Co., and Enid G. Wolf, Philadelphia School System.** — In a previous paper presented at the 1958 ASHA Convention the authors developed a speech learning theory based on feedback theory. Three models were described. In this paper the analysis of these models for the linear learning low threshold problem were considered. First the linear learning process was described qualitatively. This is compared with the nonlinear learning process from which it is evident that certain conditions distinguish the one process from the other. Conditions are then formulated for the linear speech learning process with indications to obtaining similar conditions for the nonlinear learning process. It is evident from these conditions that the range of validity of the linear speech learning process is limited but nevertheless useful. The characteristics of each of the higher order centers such as the brain, input sensory receptor, articulation center, memory storage center were discussed with emphasis placed on the linear aspect although for contrast the nonlinear aspects are briefly compared. A rationale was given for the selection of mathematical forms of the input excitation. Models for each of the various classes of excitation were given. Then, simplified mathematical forms to represent the various components of the human system are postulated. This approach is essentially phenomenological in nature. The system is then tested with some postulated excitation pulses and the response is noted. It turns out that the system copies the excitation under certain conditions. Under other conditions it fails to exactly copy the excitation but responds according to its own dynamics. The various classes of excitation are represented by mathematical forcing function models and both positive and negative feedback states are solved. The general method of analysis is then discussed briefly leading to the more general problem of the nonlinear speech learning feedback problem. Next both tabulated and graphical data obtained from these models are compared with known emperical data to contrast the validity of the mathematically assumed characteristics with deficiencies in them arising as a result of simplifying assumptions. Finally the effects of noise are considered upon the response of the various models namely the primary, secondary and tertiary speech feedback models and then some consideration is given to the high threshold problem.

An Experimental Investigation of the Speech Mechanism as a Servo System. **Stephen P. Quigley, Gallaudet College.** — The investigation took its orientation from a conception of the speaking system as an automatic control system in which the output is mediated by feedback signals from the auditory, proprioceptive and tactile end-organs, and from the recent use of delayed auditory feedback as a method of investigating its operation. Since delayed auditory feedback interferes with only one of the sensory feedbacks in such a system, and that incompletely, the disturbance of the output is not complete, and appears to be partially a function of the extent to which the speaker is able to utilize the undelayed auditory and nonauditory signals deliberately. It has been proposed that impromptu speaking should be more vulnerable to disturbance by delayed auditory feedback than should reading, since the speaker, unlike the oral reader, must formulate his own verbal symbols and must rely more fully upon the automatic features of the system which produces them in acoustic form. This investigation was an experimental test of that proposition. Seventy-five young adult male subjects read and spoke under conditions of amplified auditory feedback, with and without a time delay of 0.3 sec. Measures of their vocal output were made, and the effects of the experimental conditions upon the vocal output were examined. The major effects of the four experimental conditions were as follows:

The absolute and relative increases in duration produced by delayed auditory feedback were significantly greater for speaking than for reading. The findings for correct words were similar to those for duration. Delayed auditory feedback substantially increased the mean sound pressure, but the increase in speaking exceeded the increase in reading. The results support the proposition that speaking is more vulnerable to the effects of delayed auditory feedback than is reading, and furnish evidence for a conception of the speech mechanism as a servo-system.

W 3—PREVENTIVE THERAPY FOR SPEECH DISORDERS.

Evaluation of a Speech Improvement Program for Kindergarten Children. **Margaret C. Byrne, Jane Wilson, and Theo Penny, University of Kansas, Lawrence.** — In order to investigate the relationship of a speech improvement program to improvement of the articulatory skills of kindergarten children, a syllabus was developed and utilized by two speech therapists in two kindergarten classes. Bi-weekly lessons, 30 minutes in length, extended over a 12 week period.

Fifty kindergarten children taught by two classroom teachers in the afternoon participated in the speech improvement program, and 50 children taught by the same two teachers in the morning sections but not given the speech improvement training, constituted the control group. All children were given three tests, which included 78 phonetic elements, both before and after the speech improvement program. For all phonemes which were misarticulated tests of the sound in isolation were given. The pretests required two sessions of 10 to 15 minutes each, with an interval of one week between the two sessions. Half of the children were given a picture test first and the other half a word stimulability test first. The same procedure was utilized for the posttests.

The syllabus was structured to enable the children to identify sounds, to be stimulated by selected sounds, to discriminate among the sounds, and to produce them in isolation and in speech. The consonants [ʃ], [s], [z], [v], and [θ], which were found to be inadequately produced most frequently in the pretests, were utilized in the study. Materials consisted of film strips, flannel board activities, action games, stories and records.

T tests revealed no differences between the two groups on the three pretests. Both groups improved during the 12 weeks; the differences between them on the posttests were not statistically significant.

Several explanations for lack of significant differences between the groups were considered. Articulation scores tended to be high on the initial tests, and therefore, the amount of improvement that could be measured by the tests was negligible. Also, since the speech improvement program was designed to improve listening skills, and since attention to production of correct articulation patterns was minimal, the tests may not have provided the best measure of the usefulness of the speech improvement program.

A Comparative Study of the Effects of Speech Improvement and Speech Therapy Upon the Articulation and Reading of First Grade School Children. **Ronald K. Sommers, Armstrong County (Pa.) Public Schools.** — No study of the differential effects of speech improvement vs speech therapy is published or known which explore the influences of these methods upon articulation and reading ability. All of the 1650 first grade children from the Armstrong County, Pennsylvania, Public Schools were subjects in this study. A county-wide speech improvement program was inaugurated at the first grade level by a staff of six speech therapists during the month of September, 1958. A total of 300 first graders received neither speech improvement nor speech therapy and served as controls. From the 1650 children 100 were sampled to receive speech therapy only. The balance of 1250 children received speech improvement only. In addition to this 40 pairs of children with severe articulation problems were matched on the basis of IQ, using Otis tests, and also on the Buck and Carter Prognostic Speech Test. Forty of these children received both speech improvement and speech therapy; the other forty children received neither and served as their controls. The pretesting of articulation was done in September, 1958. All of the 1650 children were tested by the use of picture flash cards of ten consonants which were stressed in speech therapy and in speech improvement during the year. A total of 588 of the 1650 children were found to have some misarticulation on these sounds. Post testing of articulation on those with problems was done in May, 1959. The "Primary Reading Profiles" reading tests were administered to all 1650 children in January, 1959, to get a prescore and again in May, 1959, to get a post-score. Mean differences in reading and in articulation for the members of the experimental groups were determined using two-way analysis of variance procedures. Subsequent t tests of means showing significant F ratios were also made.

Screening Test for the Prediction of Speech Disorders Among Kindergarten, First and Second Grade Pupils. **Donald B. Rice, Ohio University, Athens, Ohio.** — The purposes of this paper are (a) to describe an isolated word picture articulation screening test developed for use with pupils in the above named grades, (b) to summarize briefly the test procedure used, and (c) to review the results of test-retest findings over a three-year period. This screening test was developed to determine the relationship of the consistency of misarticulation of speech sounds to the spontaneous recovery of speech disorders of young children. The first problem was to develop a test that would rapidly screen large numbers of young children. A test was devised using the child's own single word response to pictures, with an opportunity of checking the consonant sounds frequently found to be defective with this age child enough times to give a check on consistency of the response. To check on the relationship of consistency of errors to spontaneous recovery, 660 first grade children were given the articulation screening test in September 1956. The first grade pupils found to have misarticulations were divided into two groups: (a) Those whose misarticulations were consistent; (b) Those whose misarticulations were inconsistent. The children in both groups were then retested in June 1957, September 1957, June 1958, September 1958 and June 1959. The same testing procedure was started with kindergarten children in September 1957.

The data gathered have not been subjected to statistical analysis, except to compute percentages. This amount of test-retest data has provided several very interesting indicators which would be of value to public school speech therapists who find it necessary to select for therapy only a few of the many kindergarten, first and second grade children who present a picture of speech sound misarticulation.

The Effect of Creative Activities on the Articulation of Children With Speech Disorders. **Barbara May McIntyre, University of Pittsburgh.** — This study was designed to evaluate the effect of a program of creative activities upon the consonant articulation skills of adolescent and pre-adolescent children with consonant articulation disorders.

A total of 32 children, selected from the speech therapy program of the Pittsburgh Public Schools, were chosen to participate in the experiment. Each child had been receiving therapy for an articulation defect and was considered by his or her therapist to be in need of further help. These children were divided into an experimental and a control group, each composed of 16 children. The children in each group were matched as closely as possible on the basis of chronological age, mental age, socio-economic status, race, and number and type of consonant articulation errors, as revealed by an articulation test.

The children in the experimental group actively participated in a program of creative activities with 185 other children from the Pittsburgh area. The six weeks' summer program consisted of creative dramatics, creative music and dance, and arts and crafts. The program was carried out three hours each day, five days a week, for a six-week period. The control group did not share in this creative experience and neither group had speech therapy.

At the conclusion of the six-week program of creative activities, the experimental and control groups were retested by the graduate students who had participated in the pre-experimental articulation evaluation. The testing instrument was also the same as that used in the pretest.

The analysis of the data showed that significant speech improvement was evidenced by a greater percentage of children in the experimental group than was evidenced by the children in the control group. This points to the need for further investigation into the dynamics of the creative process and the differences within children which appear to make creative activity programs desirable for some children and not others. It further suggests some practical applications for use of such programs with both handicapped and normal children.

Maturation Versus Speech Correction at the Kindergarten Level. **Millard T. Landers, Syracuse, N.Y.** — This study was designed to test the following null hypothesis:

"The speech of kindergarten children with moderate functional defects of articulation who have been enrolled in a public school speech correction program for one school term is not different from the speech of like children who have not been enrolled for speech therapy."

The study began with 22 matched pairs of kindergarten children (16 pairs remained at the end of the school term). The speech criterion for inclusion in the study was the incorrect productions of between five and nine phonemes in one or more positions; thus, a child, to be included in the study, could have a minimum of five and a maximum of 27 errors as determined by administering the Bryngelson-Glaspy Picture Articulation Test.

Tape recordings of the initial and terminal testing situations were made. The initial tapes were used to assist in the matching of the pairs. The terminal recordings were played for three experienced, public school speech therapists who judged the speech of each child by a weighted score (1-2-3-4-5, where *1* is good articulation and *5* is poor articulation). The reliability of the judgments and the differences between the two groups of children were evaluated statistically.

The results of the statistical analysis showed that there were no significant differences between judges or between groups at the 5% level of confidence. It appeared from the results of this study, that the children involved improved their speech as much by maturation and the regular kindergarten curriculum as by the two foregoing factors *plus speech therapy.*

It seems reasonable to assume that, in the light of the results of this and previous studies, the time of the Public School Speech Correctionist is not profitably spent in therapy with kindergarten children who have moderate functional defects of articulation.

Several methods of determining whether or not to enroll the kindergarten child were pointed out in the conclusions of the study.

W 4—COMMUNICATION: OUR AREA OF RESPONSIBILITY IN GERIATRICS.

The Philosophy of Our Profession in Reference to the Aging Population. **Mary W. Huber, Los Angeles State College.** — All professions concerned medically or educationally with rehabilitation should be aware of the important role they must soon play in helping to solve the problems of senescence. Workers already active in this field are beginning to recognize the dangers of disturbed communication in elderly persons. Disintegration of the speech function is often one of the most dramatic and one of the most tragic experiences in aging. The profession of speech correction has had its share of speech handicapped individuals falling within the later age brackets. However, there has been little emphasis on the need to study the relationships between these speech difficulties and the basic problems concomitant with the aging process itself in our civilization. Speech hygiene should eventually be included in the services provided in good geriatric clinics and schools. As geriatric medicine and special education join forces in the teamwork approach, it will be realized that the therapeutic potentialities for the aging population are tremendous. As the average length of life increases, there should be more and more mentally and emotionally mature people in our population; and if society utilizes their peculiar abilities, all ages will benefit thereby.

Communication Problems Represented in a Home for the Aged. **Marcia Rosenthal, Cleveland Hearing and Speech Center.** — In February, 1958, a hearing screening program was initiated at the Montefiore Home in Cleveland. This facility houses approximately 100 residents and also provides a day program serving a few additional geriatric patients. Three audiologists from the Cleveland Hearing and Speech Center administered individual pure-tone air and bone conduction tests to all of the residents who were physically and mentally capable of responding to the testing situation. In addition to discovering that 60% of the population tested was affected by some degree of hearing loss, it was observed that there were several other problems relating to communication. Physical and intellectual deterioration, as well as a general decrease in motivation, accounted for some problems. When multiple complaints were represented in individual cases, plans for rehabilitation had to be modified to meet personal needs. A major handicap operative in many cases was a severe loss in visual acuity or blind-

ness, which obviously altered plans for lip-reading. The program for hearing screening and rehabilitation is now contemplated as a continuing service of the home, being integrated with the medical, rehabilitative and recreational programs which are currently in operation.

Recovery Potentials of Aphasic Patients in Respective Age Groups. **Martha L. Taylor, New York University-Bellevue Medical Center.** — We have already reported in Neurology (Dec., 1957) a survey of three years' experience with aphasic patients in a rehabilitation setting. There is a point in reviewing certain of our findings that may have some significance in relation to older age groups, or the geriatric population. A series of 324 patients evaluated and/or treated in the speech department of the Institute of Physical Medicine and Rehabilitation comprised the basis for the study. All were considered to have had normal language function premorbidly, but to have sustained some form of speech disturbance associated with organic brain damage. The aphasic patients numbered 205, of whom only a small percentage had traumatically incurred aphasias, and more than 90% were considered attributable to disease processes, primarily cerebrovascular accidents. The results of our study seem to indicate that services are warranted for a large number of patients who may be considered handicapped by age, disease and long duration of symptoms. A comprehensive rehabilitation program may significantly influence the functional capabilities of many patients beyond the period of spontaneous recovery.

Information Our Profession Should Acquire and Make Available in Relation to Geriatrics. **Atwood Hudson, Rockford College.** — Those of us in clinical services and training programs are becoming increasingly aware of the need for information and sources of information relating to communication in the later years. Rehabilitation and geriatric medicine are developing at a rate that involves our profession, whether we are ready or reluctant. We should be able to answer questions when we are asked; further, we should be taking the iniative in pointing out needs for services, kinds of services that can and should be provided, and the personnel needed to administer them. As we have had to inform ourselves on growth and maturation processes in young children in order to understand speech and language development and the interferences with it, so we should now inform ourselves on the processes of aging. Information of the type presented by my colleagues on this panel is much needed in the literature of our field. We need studies on the incidence of communication disorders common to the elderly, the types of disorders associated with various chronic and progressive conditions, the potentials for recovery or for holding the line against progressive deterioration, guide lines for therapeutic management of the aged and aging, and some rational basis for determining whether an individual is too old to benefit from therapy.

W 5—AUDITORY PROBLEMS ASSOCIATED WITH VARIOUS PATHOLOGIC HISTORIES.

The Auditory Perceptual Performances of Endogenous and Exogenous Mentally Retarded Children. **Louis Lerea, Northern Illinois University.** — Without exception, studies concerned with the perceptual abilities of brain-injured children and adults performing visual, auditory, or tactual motor tasks, have supported the contention that these patients demonstrate figure-ground disorientation. The assumption is that the capacity to abstract foreground from background is an acquired complex behavior that may become impaired following cerebral insult. Researchers in comparative psychology and allied disciplines have reported, however, that under simple figure-ground stimulus conditions, the responses of experimental animals remained unaffected despite controlled deprivation of the animals' sensory system. The apparent discrepancy between the results mentioned above suggested the need for further investigation of figure-ground distortion. The question under consideration was: Do comparable groups of exogenous (brain-injured) and endogenous (non-brain-injured) mentally retarded children perform differently in a situation requiring auditory figure-ground perception? The 25 subjects in each group were free of speech and hearing problems and matched for age and intelligence. This study was designed so that 15 responses could be obtained under each of two tape recorded listening conditions: 1) auditory figure discrimination, 2) auditory figure-ground discrimination. In the auditory figure discrimination series, each subject was presented with 15 discrete pairs of recorded syllables and he was requested to judge the syllable pairs as either the "same or different." The auditory figure-ground discrimination task consisted of an equivalent list of paired syllables. In this situation the patient heard connected speech superimposed upon a syllable. Immediately following this standard presentation, a sequence of these sounds was offered. These were: 1) the standard background (connected speech), 2) the standard syllable with a white noise background and 3) the standard background with a different syllable. The listener was instructed to indicate which one of the three consecutive presentations most closely approximated the initial standard stimulus. The results of this experiment revealed no differences between the experimental groups. One possible inference that may be drawn from this study is that auditory figure-ground perception may be a function of stimulus complexity. This conclusion, if corroborated, would have important implication in prognosis and therapy of brain-damaged patients.

An Attempt to Control Acute Variations of Hearing Impairment by Steriod Therapy. **Harriet L. Haskins, Richard D. Hahn and John E. Bordley, The Johns Hopkins Medical Institutions.** — A group of some 30 persons, children and adults, with acute variation in their hearing function has been treated with steriod therapy. A sizeable proportion of this group is known to have a hearing loss associated with a syphilitic condition. Others have hearing impairment believed to be related to viral infection. A third subgroup has acquired a sudden unexplained increase in hearing impairment. All are neural auditory problems, involving hypoacusis or dysacusis, or both. Each individual has been followed carefully by an internist, an otologist, and an audiologist. The selection of persons for this clinical study has been based on a thorough physical evaluation. Efforts have been made in each instance to determine as soon as possible the effectiveness of steriod therapy. With those for whom this has proved true, there has been follow-up for several months. One of the most critical indices of improved audition is the discrimination score. Various analyses are made of similarities and differences among the three groups, and among different individuals within each group.

Hearing, Language, and Perceptual Functions of Children Who Had Tubercular Meningitis. **Rosalind Ratner Levy, New York University-Bellevue Medical Center.** — An investigation of hearing impairment in children who had tubercular meningitis was conducted as part of a recent research project at NYU-Bellevue Medical Center. Further study of the group included language and perceptual disturbances. Focus of the project was on the presence or absence of central nervous system involvement as documented in the various evaluations done. The population consisted of 18 male and 15 female patients in the age range of 3 years 7 months to 20 years. The following evaluation procedures were used in this study: (1) pure-tone audiometry, (2) evaluation of language and speech procedures described by Kastein, including the Bender-Gestalt test for visuo-motor function as an integral part of the language evaluation. The results of this investigation were: (1) 12 patients had normal hearing and 21 patients had abnormal hearing. Eleven of the patients in the abnormal group had hearing adequate for speech, and the 10 remaining patients showed hearing not serviceable for speech. (2) 20 patients showed language development within the normal range and 13 patients were judged to have impaired language functions. However, of the 20 patients with apparent normal language functions in the group being investigated, deviations in visuo-motor function, behavior, and learning were noted. (3) The speech pathologist's evaluation indicated that of 26 sets of Bender-Gestalt visuo-motor responses, 16 patients were judged to have normal function in this area, and 10 patients were judged to have abnormal visuo-motor function (abnormal as a reflection of organic involvement). (4) When the speech pathologist and the psychologist made independent judgments of the Bender-Gestalt visuo-motor responses, agreement as to the existence or non-existence of organic involvement was found in 23 out of 26 sets of responses. In addition, for each patient, there was a comparison between the psychologist's judgment of the existence or nonexistence of

organic involvement based on the Bender-Gestalt, and the speech pathologist's judgment of the existence or non-existence of organic involvement based on language functions. In 19 cases functions in these areas reflected each other. It is concluded as a result of this study that visuo-motor testing by the speech pathologist should be an integral part of language evaluation procedures, and should be considered another differential diagnostic tool. Further, deviations in hearing, language, perceptual functions are significant sequelae in children who had tubercular meningitis.

Audiologic Evaluation of Hemiplegics With and Without Aphasia. **Maurice H. Miller, State University of New York, Downstate Medical Center, New York.** — A multiphasic approach to the study of aphasia and brain pathology is in progress at the Jewish Chronic Disease Hospital in Brooklyn, New York. As part of the battery of diagnostic examinations which are being used in the evaluation of patients in this study, it was decided to include a complete audiological work-up. The specific reasons for including such an evaluation are: 1) to determine whether hearing problems play a significant role in aphasia and, if so, to determine the nature of these problems; 2) to investigate the types of auditory problems, if any, characteristic of right and left hemiplegic patients who have sustained a CVA and to determine significant differences that might exist between these two groups of patients. Results of audiologic evaluations of a group of non-hemiplegic, non-aphasic patients of comparable age to the patients under study serve as a control. The present paper reports some of the results of the detailed audiologic evaluation administered to all patients in the study within the limits of the patient's ability to respond to these procedures. This evaluation includes pure tone air and bone conduction audiometry, tests for recruitment when applicable, and speech audiometry, including speech reception thresholds monaurally and bilaterally via earphones, discrimination in silence at a level of 40 db. above the SRT, discrimination in noise using a signal/noise ratio of plus 10, and a shortened version of the Doerfler-Stewart test. A record of the patient's incorrect responses to the phonetically balanced words used for tests of discrimination of sounds is repeated by the patient. The degree to which these audiologic procedures can be applied to patients in this study is reported. Right and left hemiplegic patients are compared according to: 1) incidence of hearing loss and the relation of this incidence to the presence or absence of aphasia; 2) degree and type of hearing loss found; 3) relation of pure tone average and speech reception threshold; 4) discrimination scores and patterns of work and sound substitutions; 5) degree of breakdown of discrimination in a background of noise evidenced by tests of discrimination in noise and Doerfler-Stewart ratios. The effects of some of the phenomena of brain damage as they affect the patient's responses to the audiologic procedures will be considered, including perseveration, receptive involvements, echolalia, short attention span, catastrophic reactions, lability of response, and disturbances of figure-background relationships.

Speech Reception in Noise for Cerebral Palsied Children. **Bruce M. Siegenthaler, Pennsylvania State University.** — The perceptual difficulties of brain-injured children have been noted repeatedly. In the main, the research in this area has been with visual perception, emphasizing figure-to-background differentiation. The present study was designed to investigate figure-background perception among a group of brain-injured children with the use of auditory stimuli. The procedure was to obtain speech reception threshold (binaural) while presenting a constant intensity white noise (binaural) to a group of 33 cerebral palsy children. A group of 17 normal children was tested in the same manner as a control group. Signal-to-noise ratios were obtained for all subjects. The signal-to-noise ratio of the defective subjects was compared with the signal-to-noise ratio of the normal subjects, and various sub-groups similarly were compared. The mean signal-to-noise ratio for normal subjects was 9.2 db. For the total group of cerebral palsy children the mean signal-to-noise ratio was 19.6 db. This difference was found to be statistically significant beyond the .001 level. Similar comparisons were made among various defective sub-groups. The data do not support the concept of a generalized figure-to-background perception disturbance. A tentative explanation for the findings of this study is presented.

W 6—PROBLEMS OF LOUDNESS AND LOUDNESS BALANCE.

A New Method of Automatically Recorded Loudness Balance Testing. **Francis M. Fodor and Godfrey E. Arnold, New York Eye and Ear Infirmary.** — The technique is based on the psycho-acoustic method of adjustment. Two tones of identical frequency generated by two audiometers are conducted into both ears alternatingly without pause between the alternations. The pulse duration is kept at 0.250 sec with a rise and decay time of 3-4 milliseconds. Thus, each ear is alternatingly stimulated twice per second. While comparing the reference loudness in the normal (or better) ear with the abnormal loudness response of the diseased (or more affected) ear, the observer indicates, with push-button operation, the just noticeable stronger or fainter sound which appears in the ear with abnormal loudness response. The push-button operation monitors the automatically recording Bekesy audiometer with an intensity change of 2.4 db per sec. The midline of the recorded oscillating pattern represents the equal loudness level. The reference loudness in the normal ear is either kept constant or may be varied with an intensity change of about 0.33 db/sec. This gradually increasing or decreasing reference tone enables one to obtain the entire loudness function of an abnormal response in the form of Fowler's graphic representation. The recorded curve is a zig-zag line. Its midline represents the continuous parameter of the entire loudness response from threshold to the highest intensity of the audiometer. Reliable records can be obtained after proper instruction and short practice; observers reproduce the first record with a high degree of similarity. Advantages and disadvantages of the method are discussed as well as some basic features which influence the results and the evaluation of loudness balance testing.

Hearing Thresholds Resulting From Varying the Modes of Signal Presentation From a Bekesy-Type Audiometer. **George J. Harbold, U. S. Naval School of Aviation Medicine, Pensacola.** — A Grason-Stadler Type E 800 Bekesy Audiometer was used for the study. Seventeen Naval Aviation Cadets served as subjects. Each subject took hearing tests daily for five days prior to being tested under the experimental conditions. After this familiarization sequence, each subject was then tested by employing combinations of the operational variables: 1) fast or slow (attenuation and chart) speed; 2) pulsed or steady tone; and 3) frequencies changing from low to high, or vice versa. Threshold hearing levels at the frequencies 5 kc, 1 kc, 2 kc, 3 kc, 4 kc, 6 kc, and 8 kc were considered. Data were treated by analysis of variance. Mean threshold level values and standard deviations also were calculated. The effects of the modes of signal presentation upon hearing measurements are discussed.

The Diagnostic Significance of Bekesy-Type Audiograms. **James F. Jerger, Northwestern University.** — The versatility of the Bekesy-type audiometer allows the clinican to obtain threshold tracings for either continuous or periodically interrupted stimuli of either fixed or continuously changing frequency. The interrelationships observed in such tracings are distinctly related to site of lesion within the auditory mechanism. In tracings obtained with continuously changing frequency three aspects are important: (1) the amplitude of both continuous and interrupted stimulus tracings; (2) the degree to which continuous and interrupted tracings are superimposed; and (3) the frequency region in which the two tracings diverge. In fixed frequency tracings two aspects are important: (1) the degree to which continuous and interrupted tracings are superimposed; and (2) the exact pattern of the change in the continuous tracings over time. Lesions in the middle ear, the cochlea, and the VIIIth nerve may be differentiated on the basis of the distinctly different pattern of results of the various tracings produced by lesions at each site.

Relationship Between Alternate Binaural Bifrequency Loudness-Balance Responses and Threshold Tone Decay Responses Among Normal and Impaired Ears. **Lennart L. Kopra and Roger W. Fullington, University of Texas.** — A 500 cps tone was used as the reference tone and a 4000-cps tone as the variable tone in the administration of the ABBLT. A span

difference was computed for each test ear by subtracting the span at 4000 cps from the span at 500 cps. The TDT was administered in essentially the same manner as described by Carhart in 1957. The TDT data were expressed in number of trials to criterion (60-second awareness). Results are summarized as follows. First, the majority of subjects with normal hearing had span differences less than 20 db. However, several of these subjects had span differences of 20 and 25 db, approaching and reaching the criterion of abnormal loudness increase utilized by previous investigators. Second, in general, subjects with a sub-normal hearing at 4000 cps (normal at 500 cps) had span differences greater than 25 db, thereby demonstrating abnormal loudness increase at 400 cps. Third, the size of the span difference appeared to be positively related to the degree of loss at 4000 cps for normal and impaired ears. Fourth, the number of trials required to reach the TDT criterion generally increased as a function of frequency. A large number of trials was noted for normal ears as often as for impaired ears. The median numer of trials appeared about the same at 250, 500, and 1000 cps, increased at 2000 cps and was largest at 4000 and 6000 cps. Fifth, the TDT did not differentiate between ears with normal hearing and ears with significant loss. Sixth, no systematic interrelationships were observed between ABBLT, TDT, and air-conduction threshold results. (This research was supported by the United States Air Force under Contract AF41(657)-35, monitored by the School of Aviation Medicine, USAF, Randolph Air Force Base, Texas.)

W 7—CINEFLUOROGRAPHY AND CINERADIOGRAPHY AS TECHNIQUES IN RESEARCH AND DIAGNOSIS.

Methodological Aspects of Cinefluorography in Speech Research. **Kenneth L. Moll, State University of Iowa.** — Cinefluorographic equipment is now being used for basic speech research at the State University of Iowa. The equipment consists essentially of a Phillip's five-inch image intensifier tube, a rotating anode X-ray tube, and an Auricon, sound-on-film, 16 mm. movie camera.

This paper presented a discussion of the procedures used for calibration of the equipment and of the problems encountered. The results of preliminary methodological investigations were presented with respect to: (a) optimum exposure factors, (b) radiation dosage involved, and (c) quality of the film and sound track obtained.

Procedures for projecting individual cinefluorographic frames and for the tracing and measurement of speech structures were described and discussed. Data on the reliability of such tracings and measurements and on the adequacy of sampling were presented. In addition, preliminary results of physiological positions and movements during the production of several different phonemes were presented and discussed.

Cineradiography as a Diagnostic Tool in the Study of the Speech Mechanism. **Robert F. Sloan, Elsie Hahn, William Hanafee, Franklin L. Ashley, University of California at Los Angeles.** — This paper presented one of the first cineradiographic studies of the speech mechanism in action. A number of excellent articles have been written on the physiology of the swallowing mechanism in recent years with the analysis of speech being only complimentary to the studies. In agreement with many other investigators the authors feel that the advent of high speed cinefluoroscopy as compared with ordinary radiographic techniques such as fluoroscopy or the use of "spot" films has greatly increased the efficiency of diagnosis. In each patient the speech areas were coated with radio-opaque film by oral intake of both the fluid and thick barium concentrates. Following these initial swallowing procedures, a speech examination was given and a tape-recording was made. For the examination a Westinghouse Image Amplification Unit and Cinecamera were used. Both normal and pathological speech cases were analyzed.

The objectives of this study were: (a) to gain basic knowledge concerning the function of the pharyngeal, laryngeal, and nasal areas in normal and abnormal speech production; (b) to develop diagnostic techniques for future use, and (c) to demonstrate the use of cineradiographic instruments in analyzing the physiology of the speech mechanism.

W 8—SPEECH AND VOICE PROBLEMS RELATED TO MOTOR DYSFUNCTION.

Speech Patterns of Muscular Dystrophic Individuals. **James M. Mullendore, University of Virginia, and Ralph J. Stoudt, Jr., University of Michigan.** — Muscular dystrophy, a motility disorder characterized by progressive muscular wasting that is not subsequent to any demonstrable disease of the nervous system, causes extensive generalized degeneration of the striated musculature. As this degeneration proceeds, it affects the muscles controlling the speech mechanism. West designates the resulting speech problems as "myopathic pseudodysarthria" and alerts the therapist to special problems presented by this disorder. Very little information concerning these specialized speech problems has been reported. The details of a specially developed test to evaluate the hearing, gross movement of the articulatory organs, phonation, and duration of muscular dystrophic individuals were presented and discussed. Following a summary of the four major types of dystrophy, the nature and extent of speech disorders present in each type as observed in the patient sample of 32 cases were described.

Suggestions for the clinical handling of speech therapy with muscular dystrophic individuals were considered.

Speech Problems of Patients With Multiple Sclerosis. **Mary Farmakides, Highland View Hospital, Cleveland, Ohio.** — Some basic information was reported about multiple sclerosis, one of the most incapacitating of chronic diseases. Along with this review of the literature concerning multiple sclerosis was discussion regarding the speech problems encountered in this disease and the speech therapy techniques practiced and found valuable in the Speech Therapy Department of Highland View Hospital in Cleveland, Ohio.

A total of 92 patients with multiple sclerosis have been seen since the program began in 1953. The prominent characteristics of these patients' speech were: (a) nasal voice quality; (b) weak volume and a poor respiration cycle; (c) changes in vocal pitch and a lack of inflection; (d) indistinct articulation; (e) slower rate of speech; (f) impairment of diadochokinetic rate of the tongue and mandible; (g) chewing and swallowing difficulties; (h) emotional lability.

Although speech therapy will not replace function which has been lost, it can improve the function of the weakened muscles and prevent disuse atrophy of the residual capacities. The speech therapy techniques which have been used in this program to fit the needs of the patients with multiple sclerosis were discussed.

Speech Therapy for Parkinsonian Patients After Brain Surgery: Immediate and Long-Term Goals. **Jane Dorsey Zimmerman, William H. Canfield, William A. Jones, and Mary Marcellus, St. Barnabas Hospital in the Bronx, New York.** — Speech therapy given to a large group of patients with a diagnosis of Parkinson's Disease who have undergone brain surgery (chemopallidectomy and chemopallidothalamectomy) for the alleviation of tremor and rigidity was discussed.

The speech therapy techniques and procedures for language, voice, speech and rhythm therapy were reviewed, demonstrated with recordings, and evaluated in terms of immediate and long-range plans for therapy on the basis of post-therapy-predischarge and follow-up speech evaluations.

Speech therapy is directed toward (a) helping these patients who are dysphonic and dysarthric immediately after surgery to regain some use of oral language as soon as possible, and (b) enabling the patients to regain (or develop) adequate language, voice, speech and rhythm skills during the short time they remain in the hospital and to maintain these skills after they return home. It is likely that referrals of these persons as in- and out-patients will increase greatly. More and more of them each year are so improved after surgery that they can return to their homes and often to their previous positions or to new work. These patients consider speech therapy one of the most important factors in their rehabilitation program. The

responsibility of providing the best speech therapy possible is challenging and timely.

Speech Deficit in Amyotonia Congenita. **Rita Gotterer and Chester A. Swinyard, Institute of Physical Medicine and Rehabilitation, New York University, Bellevue Medical Center.** — There is great uncertainty regarding the etiology and clinical identity of amyotonia congenita and its relationship to several other neurological conditions. For the purpose of this study, the following signs were considered to be characteristic of this syndrome: congenital variable degrees of widespread weakness, hypermobility of joints, absent deep tendon reflexes, and electromyographic evidence of muscular denervation. All of the 15 patients ranging in age from eight to 37 years who were included in this investigation exhibited these signs.

The muscle weakness involved axial as well as appendicular muscles, and the vital capacity was markedly reduced in all patients with resultant deficits in the volume and duration of phonation. The duration of phonation varied between one-third and one-half of normal. In some cases, the duration was limited in part by a complicating scoliosis.

The only place in the intact body where muscle fiber fibrillation characteristic of denervated striated muscle can be seen with the unaided eye is through the thin mucosa of the tongue. Of the 60 patients studied with this syndrome, approximately 40 percent showed fibrillation of the tongue. All of the patients included in this report exhibited this sign. Electromyographic and cinematographic record of this ringual activity were presented and discussed with reference to the speech deficits related to deviant lingual activity.

W 9—WORKING WITH PARENTS AND CLASSROOM TEACHERS.

Speech Correctionist, Classroom Teacher, Parents, and the Child With a Speech Defect. **Jeane Stern, University City (Mo.) Public Schools.** — A public school program was described which was tried to utilize classroom teachers and parents as an integral part of remedial speech therapeutic procedures. This cooperative program was first attempted in 1946 and has gradually become an accepted part of regular school activities.

The report was centered around techniques and materials used in group as well as individual conferences with parents and teachers. Group meetings for the parents are held in the individual schools during the latter part of October. These meetings are designed to give the parents a chance to consider mutual speech problems of their respective children, rather than feeling alone with their problems. While there are no statistics testing the results, there appears to be positive correlation between this cooperation and speech improvement and carryover.

Methods and approaches used in this cooperative program are constantly being revised. The final objective is that of complete cooperation between Speech Correctionist, Classroom Teacher and Parent plus improvement of remedial procedures.

County Speech Services: A Clinical Program in the Public Schools. **Gerald G. Freeman, Oakland County Board of Education, Pontiac, Michigan.** — During the past year a new type of clinical speech program has been developed in the public schools of Oakland County, Michigan. This program is operated through the County Schools Office as part of a comprehensive tax-supported special education program. Its goal is to provide optimum service to speech defective children through coordination of clinical and classroom practices at the local school level.

The County speech services are under the direction of a speech pathologist (Ph.D.). The speech pathologist serves as a consultant to and resource person for the more than 50 speech correctionists practicing in the 31 autonomous school districts located in the County. The services provided are supplementary to those offered by the local speech correctionists.

Diagnostic Consultations: On request of a speech correctionist, the speech pathologist conducts diagnostic examinations. These examinations are held in the schools. A "team approach" is utilized involving interested personnel—teachers, principals, psychologists, visiting teachers, and school nurses.

Intensive Speech Correction Programs: Intensive speech correction programs are held at the County Speech Clinic. The staff of the Clinic includes the speech pathologist, two speech correctionists, and a social worker. The County psychologists are available for consultation. Speech correctionists throughout the County refer to the Clinic those cases in need of intensive work. The children attend small group and individual classes for six weeks, 2½ hours a day, three days a week. Observation facilities are provided so that speech correctionists and other school personnel may participate actively in the program. In this manner, the County program is closely coordinated with the regular school program.

Pre-school clinic programs, involving children and their parents, are conducted for two week periods.

Services To Special Education Rooms: Periodically diagnostic speech clinics are conducted in the rooms for mentally handicapped children and the rooms for orthopedically handicapped children.

Educational Programs: The speech pathologist conducts and participates in programs for parents, professional meetings, and inservice training programs for speech correctionists and other school personnel.

Certification of Caseloads: The speech pathologist serves as the state certifier for the County.

The program of speech services offered through the Oakland County Board of Education is designed to meet the needs of a specific group of speech correctionists. It is an attempt to "bridge the gap" between the Clinic and the public school. It is flexible and everchanging. Hopefully, it represents some ideas which are adaptable to other locals.

How You Talk: A Radio Series Correlated With Classroom Work. **Elizabeth Ash Hawk, Toledo Board of Education.** — A bi-weekly radio broadcast known as "How You Talk" has helped to bring about a better team relationship of child, parent and teacher for the city of Toledo. Primary teachers long recognized that the standard of speech among young people was badly in need of attention. Many parents were receptive to speech improvement for their children but faced any contribution which they might make with great insecurity and feelings of inadequacy.

Station WTDS—FMC Radio—T.V. and the Education Department of the Toledo Public Schools provided a means by which programs in speech improvement might be offered to primary children, their classroom teachers and their parents.

The fifteen minute program follows a format which is carefully prepared to meet the day's need for relaxation, sound production and discrimination with class participation and which suggests daily material which may be used for practice prior to the next broadcast. A handbook is distributed to all classroom teachers and is available to parents on request. Mirror work, a practical knowledge of speech organs, songs, games, rhymes, and riddles using the reading and spelling vocabularies of the classroom all interlace to improve the efficacy of every child's speech.

Parent Counseling in the Public School Speech Therapy Program. **Elizabeth L. Walker, Kalamazoo (Mich.) Public Schools.** — The reasons parental counseling is advisable are numerous. The most outstanding ones seem to be: 1) The need to help parents understand their child and his speech and to help the therapist understand the speech handicapped children seen in therapy; 2) The need to help the parents concept of themselves and their behavior and their influences upon their child: 3) The need to help some parents who have not been able to accept their child as being imperfect; 4) The need to have parents know and understand what speech therapy is and what it is trying to do so that they help the program, not hinder it. Among the various approaches to parent counseling that were discussed are: (a) Therapy suggestions given in a brief interview with the parents of children attending pre-school clinics in the Kalamazoo Public Schools. (While a scientific study has not been undertaken a subjective evaluation of procedural policies show this to be advantageous); (b) Release time at schools to confer with every parent before the child is accepted for therapy in the public schools; (c) Weekly counseling of parents of cases receiving intensive therapy in the clinic; (d) One therapist remaining in the clinic during the school year to

give therapy and parental counseling with pre-school age stutterers only; (e) Parental group counseling done twice a month with the parents of school age stutterers; (f) Coffee hours held during release time and/or at night during which parents of the children seen by the public school speech therapist come in to discuss their child and his speech; (g) A central clinic in each large school system. (Therapists would alternate coordination days to use these facilities fully for individual therapy and parent counseling of the very severe cases); (h) In one large or in several small systems, one therapist who exclusively sees the very difficult cases and counsels the parents.

Similarities and Differences in Attitudes and Traits in Mothers of Stutterers and Mothers of Children With Articulatory Disorders. **Miriam Halper, Hicksville School System, Hicksville, Long Island.** — This study was undertaken to determine what similarities and differences exist in the attitudes and psychological traits of mothers of stutterers and mothers of children with articulatory disorders. It was conducted under the guidance of Professor Jon Eisenson.

The subjects of the study were mothers of children who attended the Queens College Speech and Hearing Center and a control group of local mothers.

A psychosomatic inventory and an attitude test were employed to obtain a psychological evaluation of maternal traits among the following three groups:

(a) 25 mothers of children with functional articulatory defects
(b) 25 mothers of stuttering children
(c) 25 mothers of children with normal speech

The findings in the study indicate that the mothers of speech-defective children were more insistent on immediate response by their children to orders than were the mothers of children with normal speech. The former group of mothers also felt that their children were not as socially advanced or as well behaved as they should be. However, the above correlations between parents of "normal" children and those of children with speech defects were low.

The only substantial statistical difference between the groups of mothers concerned adverse evaluation and early attempts at correction of children's speech. This study produced no conclusive evidence for determining any causal relationship between early speech correction by the mother and the speech disorders.

The findings of this study indicated no significant differences between the mothers of children with articulatory defects and the mothers of stutterers.

Further study seems indicated to determine the individual factors in this complex etiology.

W 10—AN INTERNATIONAL AUDIOMETRIC ZERO

An International Zero Reference Level for Audiometers. **Hallowell Davis, Central Institute for the Deaf.** — The present British Standard zero reference level for audiometers is about ten decibels more sensitive than the American Standard. It represents quite well the hearing of otologically normal, well-motivated young adult listeners. International sentiment favors this rather than the American Standard. A change of approximately ten decibels could be made in American audiometry with little expense and a minimum of confusion with the help, during a transition period, of audiogram blanks carrying both the present American and the proposed International notations. Three major otological organizations have endorsed such a move in the interest of international standardization.

Clinical Significance of the New Audiometric Norm. **Raymond Carhart, Northwestern University.** — An international reference level for pure tone audiometry will undoubtedly be accepted soon. This level will be about 10 db better than the present American norm. We will, therefore, be faced with the task of readjusting our clinical records and our criteria for case management appropriately. The transition will be largely one of revising our habits of thinking. For example, since a person now labeled as having 35 db loss will be designated as having 45 db loss on the new scale, the clinician must learn to interpret 45 db on the new scale as representing the mild social impairment he currently associates with the 35 db hearing level. The most difficult aspect of transition will be the revision of legal criteria. Schedules of compensation for damage to hearing, regulations for educational placement and the like must be rephrased in terms of the new international norm. Unfortunately, many persons whose concurrence must be obtained in order to make the change are audiologically unsophisticated. Confusion, resistance and antagonism must therefore be anticipated and counteracted. The contemporary American norm for speech audiometry is too good in relation to the American norm in the 500-2000 cps range. Consequently, when measurements are made with instruments meeting ASA specifications, clinical thresholds obtained by about 7 db. Clinicians have not always understood this problem, but their solution has generally been to bring the speech audiometer into agreement with the pure tone scale by empirical calibration. Confusion will continue until a norm for speech is designated which conforms to the reference level for pure tone audiometry. The present American norm for speech will need only slight modification to achieve conformity with the proposed international norm for pure tones.

Normal Threshold of Hearing. **James P. Albrite, Walter Reed Hospital.** — Normal threshold of hearing, using the British and the American standard earphones, was investigated. Voltage measured at the earphone terminals and sound pressure level at the entrance of the external auditory canal were determined. A specially designed headset was used to control the lateral force and the weight. Measurements obtained from this study will be compared with the ones obtained by Dadson and King in England, Gleklin in Russia, Sivian and White, and the Beasley Survey. Some thought is being given to the establishment of an International Standard. This will have wide implications to the U. S. Army in terms of entrance requirements and retention in active duty, as well as in the field of otology in the diagnosis and interpretation of hearing levels.

Medico-Legal Implications. **Aram Glorig, Los Angeles.** — A shift in the direction of a lower threshold of the zero reference level for audiometers will cause temporary confusion when medio-legal criteria are considered. Normal hearing and impaired hearing areas within the audiometric range will assume new number relations. The reorientation process will be relatively easy for the medically oriented individual, but the non-medical person will have difficulty understanding that the range of human hearing remains the same and that only the numbers on the audiometric scale have been shifted.

W 11—SPEECH AND LANGUAGE DEVELOPMENT

Delayed Speech Development as a Chief Complaint. **Richard M. Flower, University of California School of Medicine.** — The paper is based on a review of a population of 150 successive admissions to the outpatient service of the University of California Medical Center of children between the ages of three and eight with delayed speech development stated as one of the chief complaints. Two major areas are considered: (1) The essential problems represented in the population of which delayed speech development was symptomatic. It was readily evident that mental deficiency and marked hearing impairment were the two most frequently significant findings. Neurological evidence of encephalopathy was relatively uncommon. and obvious evidence of psychopathology was extremely rare. Clear demonstration of specific language disorders in the absence of generalized intellectual deficits or sensory impairment was possible with only four patients. (2) The relative contributions of the various diagnostic procedures commonly used in the evaluation of such children within a medical facility. As reported by parents to the examining pediatrician, pre-natal, birth, and developmental histories, except for descriptions of speech development itself were considerably less remarkable than might be anticipated. Routine pediatric evaluation seldom revealed contributory information regarding the etiologic basis of delayed speech development. With the largest number of patients, the evaluations by other specialists served to "rule out" identifiable pathology rather than to describe etiology. Two problems are apparent: Too frequently the negative findings of the

physician lead him to conclude "idiopathic disorders" or uncomplicated normal variations in rate of development when specific pathology was later identified by the psychologist, the audiologist, or the speech pathologist. Often speech pathologists expect more in terms of precision of diagnostic identification from the physician (particularly the neurologist) than conventionally employed diagnostic techniques permit.

Sex Differences in Language of Kindergarten Children. **Harris Winitz, University of Kansas.** — A comparison of the language skills of 75 boys and 75 girls of kindergarten age was made. The subjects were randomly selected from children expected to enter the kindergarten classes of the Iowa City schools in September, 1958. The sample was restricted to physically normal, white, non-stuttering, monolingual, normal-hearing (as determined by a pure tone screening test), mentally normal (WISC Full Scale IQ of 70 or above) children. Each child was administered the Wechsler Intelligence Scale for children and four language tests: verbalizations, Templin Screening Test for Articulation, Ammons Full-Range Picture Vocabulary Test, and certain word-fluency measures. The mean chronological age of the children was approximately 63 months. The two groups were found to be essentially the same on four nonlanguage variables: chronological age, IQ, socio-economic status, and family constellation. On the language variables statistically significant differences were found in favor of the girls on two of six verbalization measures (mean standard deviation and mean of the five longest responses) and one of three-word-fluency measures (child names). On the Templin Articulation Test and the Ammons Vocabulary Test no statistically significant differences were found between the sexes. It was concluded that the hypothesis of no differences between the sexes appears tenable with regard to the major verbalization measures (length of response, number of different words, and structural complexity), articulatory skills (as measured by the Templin Articulation Test), vocabulary skills (as measured by the Ammons Vocabulary Test), and three of four word-fluency measures. It was emphasized that any generalizations made from the findings of this study should be restricted to five-year-old children.

The Spoken Language of Educable Retarded Adolescents at a State Residential School. **Sidney Goda and Belver C. Griffith, E. R. Johnstone Training and Research Center, Bordentown, New Jersey.** — Studies of retardates present the picture of a generalized disability at every level of language functioning. To cast further light on some of these defects, articulation and sentence structure measures were obtained from students at a state residential school. Responses to the Henja Developmental Articulation Test were obtained from 250 subjects. A group of 25 pictures of commonplace events were used to elicit sentences from 150 of these students. The subjects fell in the IQ range of 45-85 and age range of 12-21. Results showed that 40% of the subjects have articulation defects, half (20%) of the defects being sufficiently severe to justify therapy. A normative analysis of the data was compared with previous surveys of retarded and young normal children. A correlational analysis was made of the results to discover the relationship of the speech measures to sex, race, age and mental age. This analysis included from the articulation test, measures of the number of errors, kind of error and position of error within the word. From the elicited sentence, two measures, sentence length and number of syntactical elements, were included in the analysis.

Use of the Terms "Speech" and "Language" by Speech Pathologists. **Jesse J. Villarreal and Ora Bennett, University of Texas.** — A growing interest in the central processes involved in symbolic behavior, and in the pathological states associated with disorders of verbal production and reception, is reflected in the increased use among speech pathologists of terms like "speech and/or language defects" and "speech and/or language therapy." Failure to use these terms consistently, or to define them operationally, is further complicated by the use of these same terms, with different meanings, by other areas of specialization, particularly linguistics and the education of the deaf. The present study reports the results of a survey among speech pathologists to determine the extent to which a distinction between speech and language disorders is held to be meaningful and useful in diagnosis and therapy.

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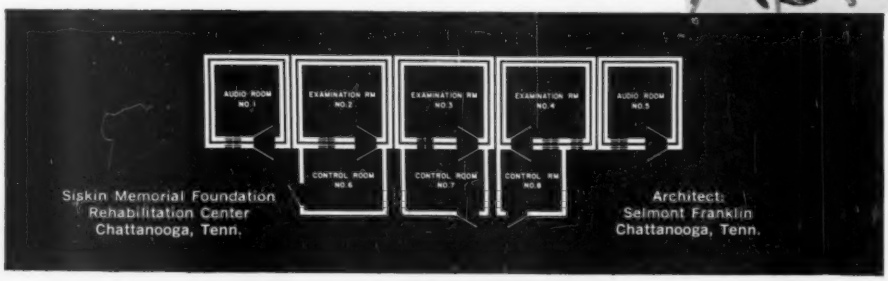

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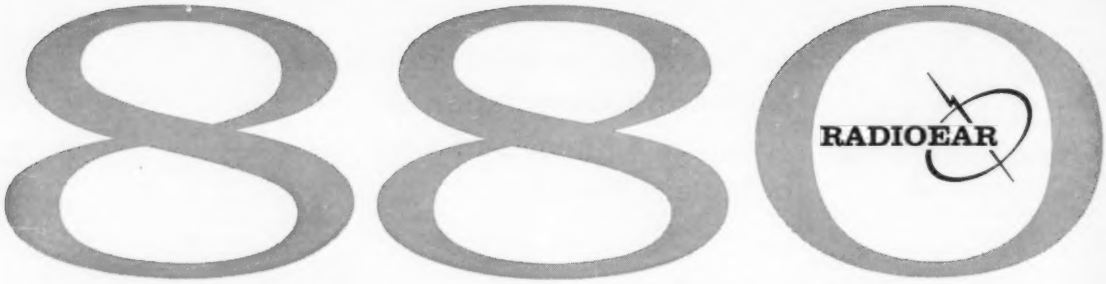

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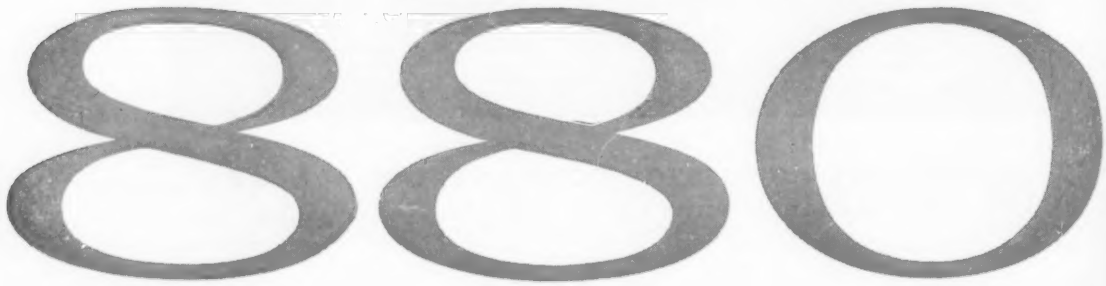

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T 3—PRACTICAL MATERIALS FOR SPEECH THERAPY

Feasible and Effective Record and Report Forms in Public School Speech Correction. **Margaret Hall Powers, Chicago Board of Education.** — The work of the public school speech therapist can be made easier and more effective through development of skillfully designed record and report forms, appropriate to the specific situation in which the therapist is working.

Forms are useful for the following purposes:

(a) Screening of school populations or referral of cases to the therapist

(b) Diagnostic examination and case history, including supplementary tests and information from other sources

(c) Therapy and progress record

(d) Case load roster and therapy schedule

(e) Forms to facilitate communication to and from parents, teachers, administrators and other professional associates

Forms should be designed so that they can be easily and rapidly used by the therapist. They should facilitate, not complicate, the therapist's work. They should assist the therapist to systematize and objectify his case examination, information gathering, diagnosis, therapy planning and recording, progress evaluation, and his record of all contacts made in connection with his work on the case.

The Round Robin: A Clearinghouse for Materials and Techniques in Public School Speech Therapy. **Clara K. Mawhinney, Bradley University, Peoria, Illinois.** — The Round Robin newsletter in Illinois is eleven years old. It was started at Northern State Teachers College at De Kalb, Illinois, under the sponsorship of Mrs. Marjorie Burkland at the suggestion of Mr. Ray Graham, Director of Education for Exceptional Children, and Miss Martha E. Black, assistant director in the same department.

From 1952 to the present time, it has been sponsored by the Psi Chapter of Sigma Alpha Eta, with Dr. Clara K. Mawhinney as advisor for the chapter. Its continued growth and success is perhaps due to the supervisors of speech correction in the state of Illinois, namely Miss Martha E. Black and Mr. Milton Eastman. These two people request contributions of therapy tips and urge the speech correctionists to subscribe to the newsletter.

Subscribers to the Round Robin are made to feel that the newsletter is theirs and any suggestion is good, provided they have found it so in therapy practice.

Many of the subscribers have been members since its origin. A first year speech therapist or a "transfer from another state" feels at home in Illinois when he can read the comments of the other therapists in the state. There is a feeling of security as speech therapists feel "they're all in the same boat!"

Besides the unusual therapy tips, suggestions for group activities, and listings of new books or sources for free material, there is a wealth of material in professional advice. Excellent suggestions have been made in the areas of (a) "Proper preparation and attitude" (b) "Ask yourself why" and (c) "Selling our program." There are pleas for area meetings, lists of areas where groups have already been organized and many suggestions for professional public relations.

Personal news of honors that come to individual members in the Illinois program and news from out-of-state people who used to teach in the Illinois program make a colorful and attractive newsletter.

Original Materials for Teaching Oral English to Pupils with a Foreign Home Language. **Evelyn B. Schmeltekopf, San Marcos (Texas) Public Schools.** — Language is that complex from of human behavior which associates symbols with meaning. Teachers and clinicians who teach the auditory-vocal symbols of English to pupils with a foreign home language must take into consideration the four factors of (a) vocabulary, (b) structure, (c) rhythm and intonation, and (d) phonemes. The pupils must learn to function receptively and expressively in these four areas simultaneously. The writer has devised materials to aid in classroom teaching of the four factors of oral English. Since vocabulary and structure are interdependent, to prevent overloading the vocabulary with concretisms, it is well to teach words within a syntactical framework. The Fitzgerald Key provided the structure used by the writer for her materials for teaching vocabulary. By this method inner language will develop with speech. The teacher should select words and phrases representing the pupils' life experiences. First words should be functional and easy to say to assure the experience of success. Care should be exerted to avoid words containing phonemes which do not occur in the pupils' home language, until after they have learned well-structured utterances with familiar phonemes. Many specific suggestions using original materials for various levels of advancement were presented.

Functional Articulation Inventories. **Jesse J. Villarreal, University of Texas.** — The discussion of functional articulation inventories explored answers to these questions:

1. What kinds of information can the articulation inventory provide?
   a. Descriptive: estimate of severity.
   b. Diagnostic: identification of cause.
   c. Prognostic: prospects of improvement.
   d. Evaluational: measurement of improvement.
2. What is the relationship between the length of an articulation inventory and the kinds of information it can provide? What are the practical limits of an abbreviated articulation inventory?
3. What is the reliability of the information provided by the articulation inventory?
4. What are the relationships between modes of administration and the results obtained?

Those interested in the design of articulation inventories were invited to comment on these, or related, aspects of their use. Information about published, or in-progress experimental studies was welcomed. Samples of articulation inventories, especially those that incorporate features not generally found in commercially-available inventories, were solicited for inclusion in an illustrative exhibit.

T 5—PSYCHOACOUSTICS I

Cumulative Effects of Repeated Exposure to High-Intensity Tones Upon Recovery of Auditory Sensitivity. **Vernon C. Bragg, Veterans Administration, Dallas.** — An investigation was designed to study the progress of measureable accumulation in the time required to recover auditory sensitivity following successive exposures to tonal stimulation at various intensities. Cumulative delay in recovery time was effected by presenting four series of twenty one-minute exposures of a 3000 cps tone to each subject. Each series of exposure tones was presented at one of four sound pressure levels: 85 db, 90 db, 95 db, or 100 db (re .0002 microbar). Twenty subjects with normal hearing were employed, but only one ear per person was stimulated. The order of presentation was randomized separately for each subject. Recovery time was measured in seconds from the cessation of the (3000 cps) exposure tone to the reappearance of a pulsed (4500 cps) trace tone at 20 db above pre-exposure

level. As soon as the subject responded at this level, the trace tone was reduced in intensity by 10 db, and the measurement of recovery time continued until this new level was audible. Immediately thereafter, the exposure tone was again introduced, and the sequence repeated. A single experimental session consisted of twenty such exposures and measurements of recovery time.

Factors Affecting Threshold for Tones of Short Duration. **Robert Goldstein and Joan C. Kramer, The Jewish Hospital of St. Louis.** — Thresholds for tones of various durations were determined on 48 adult subjects with normal hearing. The stimuli were bursts of a 1000 cps tone with a 7.5 millisecond rise and fall time. The durations measured from the onset to the off of the tones were: 2000, 400, 200, 100, 50, and 20 milliseconds. Thresholds were determined by the method of constant stimuli with the 60% response-level recorded as threshold. Overall there was the expected "trading" relation between time and intensity as duration decreased from 200 milliseconds. However, threshold for the 400 millisecond tone was lower than for the 200 millisecond tone, and threshold for the 2000 millisecond tone was lower than threshold for the 400 millisecond tone. An unexpected finding was the difference in the intensity-duration curve for the 24 men and the 24 women in the study. The curve was steeper for men than for women. In the intermediate range of durations there were no significant differences between thresholds for men and women. For the longest durations, however, women had significantly lower thresholds, and for the shortest durations the men had significantly lower thresholds. The 24 subjects who were less than 40 years old had lower thresholds than the 24 subjects 40 years old and older. This difference in sensitivity did not vary as a function of duration. However, five of the older subjects had to be given samples of very intense tones at 50 and 20 milliseconds duration before they could begin to respond to the weaker tones. The dependency of thresholds on sex and age may account in part for some of the discrepancies in the studies reported in the literature in which thresholds for tones of short duration have been tested clinically.

A Clinical Application of a Forced-Choice Technique in Pure-Tone Audiometry. **William K. Ickes, Southern Illinois University.** — The work of Blackwell, Tanner, and others at the University of Michigan has shown substantial differences in psychophysical thresholds according to the type of indicator of perception used. An all-or-none indicator such as the yes-no response, tends to vary greatly from influences extraneous to sensory discrimination and also tends to offer less session-to-session reliability and less intra-session reliability than a forced-choice indicator. A forced-choice indicator forces a subject to always give a positive response to one of several choices. A forced-choice indicator tends to have greater apparent validity and thresholds are considerably lower. The clinical potential of this information is discussed in terms of: (1) a technique developed for the administration of a forced-choice hearing test; (2) a simple piece of apparatus; (3) the differential in time necessary to administer a hearing test with an all-or-none indicator as compared with a forced-choice indicator; (4) individual differences between methods for a group of subjects who had been tested by both an all-or-none indicator and a forced-choice indicator; and (5) other subjective observations indicating the value of this as an audiometric technique.

Voiceless Consonant Confusion Matrixes Resulting From Low-Pass and Band-Rejection Filtering. **G. B. Tolhurst, U. S. Naval School of Aviation Medicine, Pensacola.** — The effects of certain low-pass and band-rejection filtering were studied as these were employed to modify consonant-vowel-consonant (CVC) nonsense syllables, presented as closed message sets. The low-pass filter conditions were 250, 670, and 1150 cps. The band rejection filtering simulated the threshold (MAP) curve of hearing; however, the sound pressure presentation levels were supra-threshold. Responses to each sound, each syllabic position, each filter condition, at each sound pressure level were made by 180 listeners. The resultant confusion matrixes were calculated in terms of proportions. Articulation indexes, $p(A_r)$, the mean conditional probabilities, $p(a_L)$, and response information, I_r, will be shown, as well as per cent correct response curves. Comparisons to threshold level confusion matrixes will be made.

A Study of the Reference and the 90-Day Audiograms of a Group of Air Force Aircraft and Engine Maintenance Men. **Daryle L. Waldron, USAF School of Aviation Medicine, Randolph Field.** — The reference and 90-day audiograms of a group of aircraft and engine maintenance men were examined and analyzed separately and comparatively. All of these audiograms were accomplished and graded by the same technician, utilizing a Rudmose ARJ-3 Automatic Audiometer mounted in an Industrial Acoustics Company Model 401 Audiometric Testing Room. The reference and 90-day audiograms are displayed by over-all hearing classifications, (Air Force Regulation 160-3, 1956), as determined by the individual's poorer ear, and by left ear versus right ear hearing class. The over-all hearing class breakdown for this particular sample agrees quite closely with that of the total Air Force reporting to date, the main differences being that the Class C percentage of this ATC sample is a bit smaller, and the Class B group a bit larger. The Class B reference audiograms offer the only meaningful comparison of right versus left ear hearing class. All Class A audiograms are, by definition, binaural Class A's; the Class C sample of this study is too small (N-3) for any generalization. Of the 114 Class B audiograms compared, 55 percent were so classified for both ears. Mean and median audiograms were computed by ten year age groups. In general, the left ear means and medians were higher (poorer hearing) than those of the right ear. When the left ear reference audiogram medians for the 20 to 29 year old Air Force group were compared with those of the 1954 Wisconsin State Fair Hearing Survey's "selected normal hearing" group, the Air Force group had better hearing at all frequencies. The 90-day follow-up audiograms, for the left ear, were compared with the left ear reference audiograms for 303 of these aircraft and engine maintenance men. When compared by hearing class, excluding the small Class C group, the general trend of shift in the three month period was toward the mean, i.e., the Class A group tended to record poorer hearing levels and the Class B group better hearing levels. When the classes were pooled, however, the mean differences were, with three exceptions, less than 1 db. The largest mean difference between the two audiograms was at 6000 cps in the combined hearing classes for the 40 to 44 year old age group; the shift was 4.17 db, in the direction of improved hearing. When the distribution of differences between the reference and 90-day audiograms is plotted for each frequency, using "no difference" as the center point and indicating the extent and percentage of improvement in hearing to the right of center and the extent and percentage of decrement to the left, the resulting polygon is relatively symmetrical. What skewness is to be found is in the higher frequencies: the Class A group skewing toward the poorer hearing end of the scale, and the Class B group toward the better hearing end. At no frequency does the Class B group have as large a percentage of "no difference" airmen as the Class A group. The same trends show up in the table reporting the percentage of men who showed no difference between the two audiograms, fell within plus or minus 5 db, and plus or minus 10 db. The higher the frequency, the poorer the agreement between tests; the Class B individuals demonstrated poorer test-retest reliability than those with Class A reference audiograms.

T 6—RECENT CLINICAL FINDINGS IN THE TREATMENT OF THE ADULT APHASIC

Management of the Problems of Paraphasia. **Mary C. Longerich, School of Medicine, College of Medical Evangelists.** — In treating paraphasic symptoms of 61 aphasia patients, it was found that (1) auditory agnosia, amnesic aphasia, and apraxia symptoms had to be attacked or at least partially resolved before paraphasic symptoms could be alleviated; (2) articulation exercises were totally ineffective. Helpful therapeutics included;

(a) shifting the dominance of the brain (when the electroencephalogram revealed the brain damage in the dominant hemisphere); (b) having patient perform all activities with his non-dominant hand; (c) directing patient to write all words as a unified speech-writing procedure—no reciting of the alphabet and no spelling; (d) avoiding reinforcing errors by repeating them; and (e) treating the patient not as a child, but as an adult human being.

The Use of Sodium Amytal to Facilitate Communication with Aphasics. **Michael D'Asaro, University of California at Los Angeles.** — Language disturbances in brain injured individuals often produce anxiety. What effect this anxiety plays in the language retraining program of aphasics is of concern. Attempts to use anxiety reducing drugs with aphasic patients have resulted in positive, negative, and mixed reports of success. The present study is an attempt to assess experimentally induced communication changes under controlled intravenous injection of sodium amytal in thirty neurologically diagnosed aphasic patients. The subjects had long-standing, stabilized language disabilities and were selected for their ability to respond to a variety of tests. They were then tested in three random order sessions with equated tasks under standardized conditions, using a placebo, light dosage, and heavy dosage of sodium amytal. While many performances were reduced during the periods of medication, especially those involving memory, motor coordination, and visual acuity, there was a trend toward increased spontaneous comments and improvement of performance where automatic language appeared, under light dosage of amytal. A decrease in these performances occurred under heavy dosage. The data did not indicate statistically significant differences in all such tests, but provided some clues for further investigation. The inferences drawn from the data are that under light sedation, there is a reduction of the inhibition of spontaneous and automatic speech, allowing fuller use of residual speech skills. Other anxiety reducing medications may also facilitate language with fewer deleterious side effects. On the basis of clinical observations during the experiment there was a carry over for several days of the improvement of spontaneous speech.

Management of Catastrophic Reactions in Aphasia Therapy. **Hildred Schuell, Veterans Administration Hospital, Minneapolis.** — Goldstein first described symtoms resulting from the struggle of the changed organism to cope with defect and meet the demands of the environment. In the Goldstein sense, catastrophic reactions occur when defenses are not adequate and disintegrative behavior ensues. Not all emotional behavior of aphasics should be considered catastrophic. The grief a man may feel because he cannot return to his work is a normal emotion accompanying an important loss. Expression of such feelings to an understanding clinician may serve catharsis, and deepen the clinical relationship. The easy tears and laughter of emotionally-labile patients should not be confused with catastrophic reactions. Such behavior usually decreases with time, and may be reduced by reassurance and matter-of-fact acceptance. Expression of deep emotions should be encouraged; lack of control should be accepted; castastrophic reactions should be prevented. Actually if the clinican has the trust of the patient and is supportive, they seldom occur. The clinician must not attack the defenses of the patient, but rather try to restore feelings of adequacy so the need for protective mechanisms is lessened. The clinician must be sensitive to signs of fatigue, of phyiological discomfort and situational stress. However, when a relationship of confidence obtains, the clinician can and should demand a great deal of the patient, may work intensively and hard for prolonged periods, and even deliberately give an experience of failure to demonstrate need for continued effort, with no other response than good-humored acceptance and appreciation.

Eliciting Family Participation in Aphasia Therapy. **Joseph Wepman, University of Chicago.** — Successful therapy for aphasic adults can only be achieved with the full participation of the patient's family. Their role in the total recovery process is discussed in the dual framework of the family as adjunctive to professional therapy and as the substantive therapist involved. In both roles the family's contributions to therapy are visualized in the light of four basic aspects: (1) the necessary milieu for successful therapy; (2) the necessary climate for beneficial changes in the patient; (3) the goals, both long term and short term, of successful therapy; and (4) the individual personalities of the therapy constellation. Three therapeutic plans, whereby the family is seen as providing an integral part of planned therapy are discussed. Case histories are used to illustrate each type of therapeutic plan. The need for careful selection and preparation of the family participants is illustrated and stressed.

T 7—RECRUITMENT AND ALLIED ASPECTS OF AUDITORY FUNCTION

New Suggestions for the Determination of Recruitment. **F. M. Fodor, New York Eye and Ear Infirmary.** — The main symptom of the distorted hearing mechanism called recruitment is the abnormal loudness response and most of the testing methods are based on some aspects of loudness evaluation. The aim of these methods has been the qualitative determination of the *presence* of absence of recruitment. No other differentiation could be made except among complete, and incomplete, or irregular types of recruitment. The new principle of recruitment is based on quantitative loudness measurement. A *quantification* of recruitment may be this obtained by defining an appropriate measure. The measure for a quantitative recruitment determination should express the proportion of the abnormal loudness increase re normal loudness response. This is given by the ratio of the measured abnormal loudness (L) to the normal reference loudness (L/I), called *recruitment degree.* If both quantities are expressed in decibels, the normal reference loudness is indicated by that supra-threshold level (I) on which the abnormal loudness was measured. A quantitative recruitment determination expressed in L/I values of recruitment degree leads to the recognition of different grades of recruitment which can be related more precisely to the clinical picture. In cases of complete recruitment a *relationship* exists between recruitment degree and hearing loss, as well as between recruitment degree and supra-threshold level. With this relationship, a conversion of recruitment degree into the hearing loss due to the recruiting lesion can be performed and thus the "receptive hearing loss" determined.

Sisi: A New Clinical Approach to the Detection of Extremely Small Changes in Sound Intensity. **Earl R. Harford, Royal Victoria Hospital, Montreal.** — The procedure and merits of a new approach to the clinical measurement of differential sensitivity to intensity change were reported in the February, 1959 Archives of Otolaryngology, by Jerger, Shedd and Harford. This test is called the Short Increment Sensitivity Index (SISI). Subsequent to this initial report, data have been collected at Northwestern and McGill Universities which continue to produce evidence of the apparent value of this simplified technique. It has proven to be a reliable means of differentiating cochlear from noncochlear pathology.

Masking by Bands of Noise in Normal and Impaired Ears. **Tom W. Tillman, University of Oklahoma Medical Center.** — The literature on masking of pure tones by thermal noise in impaired ears is characterized by controversy. Some workers report that noise audiometry can serve as a diagnostic too while others insist that the normal and the impaired ear cannot be differentiated by means of this technique. The experiment reported here compared the normal ear and the ear with sensori-

neural impairment due to cochlear pathology in terms of the masking produced for pure tones by three octave-band thermal noise signals. The noise signals were presented at equivalent effective levels for all ears studied. Results indicate that the normal ear and the sensori-neural impaired ear are masked to almost identical degrees at the frequencies within a given narrow-band noise signal. However, the impaired ear exhibits an excessive spread of masking to frequencies both above and below the noise band.

T 8—CONTRIBUTED PAPERS: STUTTERING I

Operant Stuttering: The Use of Delayed Feedback As An Aversive Stimulus in the Operant Control of Stuttering. **Israel Goldiamond and Bruce Flanagan, Perception and Conditioning Laboratory, Southern Illinois University.** — Operant conditioning refers to control of behavior through control of explicit consequences of the behavior. In a preceding experiment, when a loud blast of noise followed each stuttering response made by a chronic stutterer, stuttering rate diminished, and when relief from such a blast was contingent upon stuttering, rate rose. A second experiment utilized similar procedures to instate marked laboratory stuttering in individuals with normal fluencies. This experiment reports the use of delayed feedback as a response-contingent consequence. This procedure was substituted for noise because of reported systematic relations to verbal behavior.

The subjects were chronic stutterers from the Speech Clinic at Southern Illinois University. The subject read from typewritten pages, as before, and was trained to press a microswitch button upon each stuttering response. Reliability check was kept by a speech therapist. After rate of response stabilized (base-line period), as evidenced on a cumulative recorder, contingencies were attached to the response so that each press initiated a five-second period of delayed feed-back of current speech at .25 second delay. This punishment period lasted 30 minutes. There was a control period of similiar duration thereafter.

Stuttering rate was considerably attenuated during punishment periods. It rose during the following control periods, but did not fully return to its original base-line level. (This contrasts to the effects of noise-punishment, where there was full or even compensatory recovery upon its removal as a consequence). Upon repetition on following days, each base-line period is lower. The results have thus far continued for six days. Control subjects who return do not exhibit this progressive attenuation, but display marked stability during and between two hour sessions.

An Experimental Model for Measuring Stuttering Therapy. **Robert H. Hejna, University of Connecticut.** — A pressing need generally conceded by most speech pathologists at the present time is for objective measurement of stuttering therapy. The reasons for such measurement are fairly obvious. Scrutiny of this type would lead to qualitative comparison of present day techniques and approaches and to refinement of these so as to provide the most successful outcome in therapy.

The present experimental model proposed for such assessment incorporates contemporary thinking concerning objective measurement of severity of stuttering, based on the contributions of Sherman and others. Adaptation of measures designed to assess severity of stuttering throughout the therapy period, as well as other features were incorporated to allow for comprehensive analysis of total change brought about in therapy.

Using one experimental subject to demonstrate the above, severity ratings were depicted as the first means of assessment, and these were based on judgments of two-minute tape-recorded random excerpts taken at one month intervals throughout the therapy period. The ratings were made by independent judges. Another assessment was a frequency count of blocks encountered during the two-minute random excerpts. Full length recorded random interviews were also rated in a content analysis, and changes in general behavior and attitude toward the problem were depicted. This was accomplished by means of assessment of client statements, rated on a five point scale which sought to establish weights of intensity and direction of feeling throughout the therapy period.

While the experimental model described here to measure results of therapy was based on client-centered counseling as the therapeutic approach, it could easily be adapted to other types of approaches. Although it will have to utilize large samples of stutterers in long-term measurement with the tediousness and expenditures of time which this requires, it appears to be the most objective manner of approach. Follow-up studies will also be necessary.

The implications of such measurement are manifold, and include such possibilities as comparing relative merits of various approaches, rate of progress in therapy as a function of frequency of interviews, and relative merit of group vs. individual therapy.

The Effect of Punishment [Electric Shock] Upon Frequency of Stuttering. **James V. Frick, The Pennsylvania State University.** — The purpose of this study was to investigate the effect of threat and administration of punishment [electric shock] upon frequency of stuttering; specifically, to study the effect of electric shock, administered under three experimental conditions, upon: (a) the initial frequency of stuttering; (b) frequency of stuttering during 10 consecutive readings of the same 40-word list; (c) frequency of stuttering during five additional readings of the same list with threat of punishment removed; and (d) the three above named aspects *within* each of four levels of severity of stuttering.

Forty-eight stutterers were used as subjects. The shocks were delivered through two electrodes fastened to the right wrist of the subject. The duration of each shock was one second, the shock being administered at an intensity initially described by the subject as painful.

The major conclusions were:

1) Threat and administration of punishment [electric shock] has been established as another antecedent stimulus condition with which frequency of stuttering and, we infer, anxiety are functionally related. This is believed to constitute further evidence that stuttering is anxiety-motivated behavior and that the greater the expected penalty for suttering, the greater the frequency of stuttering.

2) In one condition, a shock was administered immediately after every word whether stuttered or not. The initially high frequency of stuttering in this condition and, especially, the marked decrease in frequency of stuttering after shocking was terminated implied that the effect of this condition was to induce a general anxiety, or heightened apprehensive state of the organism, essentially independent of any specific fear of stuttering or its consequences. This study is believed to be the first to present experimental evidence that such a "general anxiety" may affect frequency of stuttering.

Generalization of Stuttering Behavior Through Associative Learning. **Robert W. Peters and Walter E. Simonson, Mississippi Southern College.** — Stuttering behavior was evaluated within an associative learning model. Stutterers who served as experimental subjects learned words of low stuttering potential in association with words of high stuttering potential. They also learned words of low stuttering potential in association with other words of low stuttering potential. Paired-associate learning was by means of a memory drum. Measurement of the frequency of stuttering for the two sets of low stuttering potential words was made prior to the learning trials, after 50 trials, and after 100 trials. Amount of learning was also measured after 50 and 100 trials. The results support the prediction of the model that stuttering behavior generalizes through associative learning. Stuttering was significantly more frequent on the words learned in association with words of high stuttering potential than on the words learned in association with words of low stuttering potential. Theoretical implications of associative learning and generalization of stuttering behavior were discussed.

Stutterers' and Clinicians' Ratings of the Relative Value of the Various Activities in Stuttering Therapy.* **William D. Trotter, Marquette University, Milwaukee, Wisconsin.** —

Procedure

At the end of their therapy period 44 stutterers attending a university speech clinic were asked to rate 64 stuttering ther-

apy activities in terms of a five point scale ranging from *1. No Help* to *6. Indispensable Help*. A mean scale value was computed for each activity for the clinicians and stutterers separately by averaging the ratings given by each of these groups. The activities were placed in rank order according to their scale value.

Results and Discussion

The 10 most valuable activities according to the stutterers' ratings were: (a) Discussing with your individual clinicians the reasons why you stutter; (b) Giving a speech to an unfamiliar audience; (c) Discussing with your individual clinician your feelings about your stuttering; (d) Learning how to talk about your stuttering problem better; (e) Discussing with your individual clinician your plans for working on your stuttering after you leave the clinic; (f) Trying to decrease the number of speaking situations you avoid; (g) Leading a discussion in a stutterers group meeting; (h) Group meetings when the chief therapist gives a lecture about some aspect of stuttering therapy (such as reasons for doing mirror work, tape recording); (i) Increasing the amount of stuttering you do on purpose in your more difficult speaking situation; (j) Increasing your speaking time in your more difficult speaking situations.

The five least valuable activities were: (a) Lectures by the chief therapist about research in stuttering; (b) Joining more clubs; (c) Increasing the amount of time you spend participating in group sports; (d) Increasing the number of hobbies you share with others; (e) Writing your autobiography.

A correlation coefficient Rho was calculated between the values assigned to the activities by the clinicians and by the stutterers. The value of Rho was .55 indicating that the two groups did not agree very well with each other about the value of the therapeutics activities.

**Note:* A list of all 64 activities together with their ranking by the clinicians and stutterers was mimeographed and passed out to each person attending the meeting at which this paper was presented. The implications of these findings were discussed in detail in this mimeographed material.

T 9—MEETING THE EDUCATIONAL NEEDS OF THE YOUNG DEAF CHILD

Administrative Organization of the Day Class. **Mary Blair, State Department of Public Instruction, Michigan.** — It is advisable to locate day classes for the education of children and youth with impaired hearing in a single school district or a combination of districts with sufficient memberships to warrant organization of classes at three different instructional levels. Such units should be placed in school buildings which house children and youth of similar age who are attending regular classes. Class size should be small enough to permit individualized instruction and sufficiently large to allow group work. The latest audio-visual equipment should be provided and kept in perfect condition. Eligibility for special services or classes for children and youth with hearing disabilities should be decided upon by local screening committees. Outside consultants should be invited to assist in the screening process as needed. Because of the wide range of hearing disabilities found in most school districts, a variety of flexible organizational patterns is mandatory. Many factors besides hearing losses should be taken into consideration such as: onset of difficulty, emotional, physical, social, and intellectual status, degree of family, school, and community cooperation, and the experience and preparation of the teachers who are to render educational assistance. Parent cooperation is vital to the planning of realistic goals and should be continuous from the early childhood period until optimal vocational placement is achieved. Close working relationships should be maintained between day classes and the state residential school. Cooperation should be encouraged among private and public agencies. Children and youth with hearing disabilities must be found earlier and referred as soon as possible to the proper authorities so that appropriate assistance can be given.

Parent-School Relationships. **Genevieve Drennen Roberts, Cincinnati Public Schools.** — The demand and need for parent information concerning the communication difficulties of their children who are deaf or hard of hearing has been met and handled in a variety of ways. The history and development of such programs for parents falls into rather broad, well defined categories throughout the country. The types of programs developed depend greatly on existing facilities, resources, budget, professional skill and interest as well as working relationships between agencies and groups. Leading types of programs to be discussed as they relate to educational institutions are: 1) Parent Institutes, sponsored by state agencies and for state schools for the deaf. 2) Information Series developed in metropolitan areas to provide information to parents in a short time and often as an outgrowth of Hearing Clinic's awareness of the duplication of services. 3) Correspondence Courses as provided by clinics and universities. 4) Group Meetings originated by parents with or without professional leadership or through day schools having PTA affiliation or mothers' club. 5) Clinic and Agency sponsorship as pilot projects to provide community education. 6) National Associations to provide general information and to strengthen individual groups throughout the country. 7) Individual Counseling, as currently done by schools and/or agencies. The strength and/or weakness within these seven types will be given as possible guides to those persons interested in the development and strengthening of programs for parents of children with hearing handicaps.

Integrating the Deaf Child Into a Hearing World. **Mary K. Van Wyk, Fort Lauderdale Oral School for the Deaf.** — Integrating the deaf child into a hearing world means more than just educational integration. Social and vocational integration are equally important in the total picture. Our ultimate goal for our deaf children is for them to live and to compete with hearing people in all three areas. Though we must be realistic and acknowledge that this is not attainable for all, it is for many. In discussing this total picture by age groups, the situation is as follows: a) Infancy — social integration is excellent. b) Pre-school — most children are segregated educationally. Social integration is usually excellent. c) School years – most children are segregated during vocational training years. This is the period of greatest segregation. d) Adult years – vocational integration is a necessity. Some social integration is a must. Some enter hearing schools but most stop their educational programs when they leave the segregated school. To achieve more successful integration, steps should be taken to break down the almost complete segregation of deaf children from ages 5-20. Educational integration in a carefully coordinated program is an important trend in this direction. Vocational training in hearing schools for these children is a realistic approach to working in a hearing world. True integration can be expected to follow for the child who has been carefully prepared educationally, socially and vocationally during his developmental years.

Extracurricular Activities for the Young Deaf Child. **Helen S. Lane, Central Institute for the Deaf Child.** — The social acceptance of an adult in our society frequently depends upon the skills and hobbies he developed during childhood. The success of a deaf child in a hearing world and his happiness in this world are related to his ability to participate in extracurricular school activities and later in sports, hobbies and social activities of adults. The school and parents share a joint responsibility in preparing the deaf child for such activities: 1) By providing opportunities to develop motor skills such as dancing, swimming, playing ball and skating. 2) By teaching the language of games. Pre-school children depend upon motor activity for play but with increasing age games are complicated by language and rules. 3) By providing opportunities to develop skills and hobbies by participation in guided groups such as the Scouts or the Y groups and class instruction in arts and crafts. 4) By providing social events for association with deaf and hearing children. In residential schools the program is the school's responsibility when classes are in session and the parent's responsibility during vacations. In day schools the parents and the teachers share the program throughout the school year.

T 12—CLEFT PALATE: RESEARCH AND GENERAL

Some Psychological Aspects of Problems Associated with Cleft Palate. **George H. Shames and Jack Matthews, University of Pittsburgh; Vincent W. Byers, Ear and Eye Hospital, Pittsburgh.** — This study was concerned with determining the relationships which might exist between the adjustment patterns of an individual having a cleft palate and the extent of his communication problem. The adjustment patterns were measured by the Maudsley Inventory of Introversion, Extroversion, and Neuroticism as well as with an attitude scale which was developed specifically for the purpose of measuring attitude toward cleft palate. The measures of extent of cosmetic problem were based on self-ratings which the subjects made of their own physical appearance and also on ratings made by judges of photographs of the subjects. The speech problems of the subjects were estimated by the data gathered in developing the nasality scales and determining the relationships among nasality, articulation, and intelligibility. Appropriate correlations were computed to answer the questions concerned with the relationships between psychological problems on the one hand and cosmetic and/or communication problems on the other hand.

Cases of Isolated Palatal Paralysis. **Murray M. Halfond, Temple University, Philadelphia, and Richard W. Olmsted, St. Christopher's Hospital for Children, Philadelphia.** — As part of the extended function of the Cleft Palate Clinic of St. Christopher's Hospital for Children, patients with paralytic palatal dysfunction have been accepted for clinical evaluation and treatment. To date, four patients have been diagnosed and treated is in progress. Cinefluorographic studies revealed that palatal mobility was insufficient for palatopharyngeal closure. No occult clefts of the palate were found, and paralysis of the soft palate appeared to be the only muscular dysfunction. Markedly hypernasal speech was evident in all cases, although some of the patients had had intensive speech therapy prior to referral to the clinic. Neither medical history nor medical examination gave positive indications of the etiologies of the palatal paralyses. It was noted that there were overt emotional problems in each case. Therapeutic measures included the pharyngeal flap operation, speech prosthesis and speech therapy. While incidence may be low, it is important that the various disciplines be prepared to recognize and treat cases of isolated palatal paralysis.

Velo-Pharyngeal Movements and Tongue Carriage During Speech in Adults With Unrepaired Complete Cleft Palates. **Calvin Knobeloch and McKenzie Buck, University of Florida.** — The voluminous literature on oral clefts is devoted essentially to the techniques of medical and dental treatments. Studies of the anomality itself are few in number. What may be called the "life history" of the untreated oral cleft remains obscure. There has been no systematic description of the untreated anomaly in adults. Twenty Puerto Rican patients ranging in age from 15 to 57 with unoperated complete palatal clefts were studied. The research was sponsored by the Division of Dental Public Health, Washington, D. C. Facial growth and development of the unoperated complete cleft palate cases appear to have progressed on a normal pattern and to have achieved near-normal skeletal dimensions. Generally, there is no major discrepancy between the upper and lower parts of the face. The x-ray plates of the production of vowels, rest position, and A-P views show significantly less deviation than in repaired cases. In many instances, individuals who have complete and wide clefts produced all speech sounds except (k) and (g). Hearing test results indicated normalcy and were quite superior to those of individuals who have had early repair in the United States.

A Descriptive Study of the Speech Development of a Group of Infants With Velar Insufficiency. **Don A. Olson, University of Alabama Medical Center, Birmingham, Alabama.** — One purpose of the study was to provide a description of infant cleft palate speech development similar to the descriptions of normal speech development provided by Orvis Irwin and his associates. The Bzoch, Counihan, and Starr studies provided information regarding the speech of the preschool cleft palate child, the school age cleft palate child, and the adult cleft palate individual; another purpose of this study was to add information concerning the speech of infants with cleft palates. A cross-sectional study was planned of 60 infants presumed to be normal in all respects except for the existance of a velar insufficiency. Twelve infants were studied at each of the following five age levels: five to six months, 11 to 12 months, 17 to 18 months, 23 to 24 months, and 29 to 30 months of age. Case histories were obtained through parent interviews and examination of the clinic and hospital records. Recordings of the infants' vocalizations were obtained with high fidelity recording equipment and the recordings were analyzed by phonetic transcription. The findings were then compared with Irwin's raw data obtained from normal infants. The study revealed the following speech developmental characteristics of infants with cleft palates: (a) General developmental order of vowel and consonant sounds found for infants with velar insufficiencies is comparable to the normative data reported by Irwin. (b) Normal infants through age 18 months, however, use more vowel and consonant types than do the infants with velar insufficiency. (c) Vowel and consonant patterns become more equal at ages 24 and 30 months of age. (d) The percentage of time that glottal sounds are used does not decrease in the infants with velar insufficiencies as it does with the normal infants. (e) Normal infants use a greater variety of vowel and consonant sounds; the infants with velar insufficiency tend to use fewer sounds and to use them over and over. (f) Meaningful speech was not evident in the recordings of infants with velar insufficiencies until age 30 months.

T 15—NEUROPHYSIOLOGY OF HEARING

Neuroanatomical Structures and Physiological Mechanisms of the Cochlea. **H. F. Schuknecht, Henry Ford Hospital, Detroit.** — The discussion is concerned with an examination of neuroanatomical structures and physiological mechanisms of the cochlea and an attempt to correlate them with psychophysical measurements of hearing. All of the data is taken from experiments on animals performed within the past ten years. Frequency discrimination for humans appears to be about two to four times better than that for cats and is probably due to the difference in spatial orientation of frequency along the cochlear duct. Ability to discriminate pitch is not related to innervation density but may be due to a shift of activity in a frequency oriented neural populace. Threshold intensity for pure-tones appears to be related directly to innervation density.

Frequency Localization in the Auditory Cortex of the Cat. **J. E. Hind, University of Wisconsin.** — Study of the electrical responses of the cerebral cortex to stimulation of local portions of the cochlea has yielded a spatial pattern of frequency localization. Earlier studies utilized "gross" electrodes which record the summated potentials of large numbers of cortical neurons. The present experiments were carried out with microelectrodes which register the activity of single neural units. From a Statistical viewpoint, the frequency specificity of the majority of the single units is in accord with the spatial frequency localization pattern observed with gross electrodes.

The Cerebral Cortex and Hearing. **William D. Neff, University of Chicago.** — In experiments done on the cat and monkey, it has been found that ablation of the auditory projection areas of the cerebral cortex produces impairment in learned auditory discriminations which involve localization of sound in space, perception of temporal patterns, and perception of changes in duration. These same kinds of discrimination may also be affected by ablations of "association cortex." Absolute thresholds and difference thresholds for frequency and intensity are little affected by cortical ablations. According to a simple neural model, discriminations which involve excitation of new neural units can be made after cortical ablations; discriminations which involve stimulation of the same neural units but in different amounts or different sequences are severely impaired. The relation of results from animal experiments and results from the clinic will be discussed. (This research was supported by the Office of Naval Research and the Air Force Office of Scientific Research.)

The Psychophysiology of the Lateralization of Sound. **Bruce Deatherage, Children's Hospital of Los Angeles.** — Sounds coming to us from external sources are perceptually located in space. The accuracy with which localization is made is conditional upon some well-known physical aspects of the stimulus and upon certain less well-known characteristics of the nervous system. These characteristics of the nervous system in both humans and lower animals are best studied by listening under earphones. Listening under conditions of stimulation with earphones "internalizes" the sound image, and thus we speak of the *lateralization* of sound when it is displaced in location toward one side of the head as against the *localization* of sound in perceptual space. Some new data and a physiological model are presented.

T 16—RESEARCH IN AUDITORY STIMULATION AND DISCRIMINATION

Relationships of Auditory Discrimination to Speech and Reading Difficulties. **Joseph M. Wepman, University of Chicago.** — The results of over twelve years of experimentation with different methods of measuring a child's ability to differentiate aurally between the phonetic units of English have been presented. The product was shown as a phonetically-equated test for auditory discrimination using the method of paired comparisons. The subject listens to two words read aloud by the examiner and then indicates whether the two words were identical or not. The test has been found to be easily and reliably administered to children five and one-half years of age and older. Paired comparisons of initial and final consonants and medial vowels are randomly ordered with false choice items to avoid patterning. Norms were shown for five, six, seven and eight year old children.

Standardization of the test on unselected school populations at the kindergarten and early elementary grade levels showed a significant relationship between error scores and (a) inaccurate articulation scores, and (b) low scores on standard reading tests. A low positive relationship was found with standard intelligence test scores.

The results seem to be in keeping with the writer's frequently expressed opinion based on his studies of adult aphasic subjects and his clinical observations that: (a) the modalities of learning can and should be studied differentially, (b) children develop the ability to discriminate aurally at different rates, (c) delay in the development of auditory discrimination has little, if any, relationship to intelligence, and (d) delays in the development of auditory discrimination relates positively, and probably causally, to poor speech articulation, poor reading ability, or both.

A Review of Kansas Studies of Sound Discrimination. **James E. McLean. Kansas State Department of Public Instruction.** — The ability of a child to discriminate speech sounds in various stimulus contexts has important implications for both the etiological considerations of speech defects and therapy designed to correct these defects.

There have been several tests developed to evaluate a child's discrimination ability. Until recently, tests of sound discrimination have been concerned with a child's ability to make discriminations of aural stimulus presented by the tester. Recently, there have been studies which cite a relative incompleteness in this type of testing. Some consideration of a child's ability to make discriminations from stimuli which he himself produces orally and from picture material which is not produced by sound from any source has been undertaken in a series of studies at the University of Kansas.

A picture test of speech sound discrimination was developed. This test requires a child to make discriminations from stimuli produced by the tester, stimuli produced by the child himself, and stimuli as it can be internally structured by the child as he views the pictured material silently.

The studies present data concerned with (a) the initial development and testing of the new instrument, (b) its standardization, (c) comparison between performances on the new test and on another widely used discrimination test, and (d) the effect of a standard-type ear-training program on the scores on the new test.

The results of these studies were projected into suggestions for additional, more definitive, research.

The Prognostic Value of a Battery of Imitative and Auditory Discrimination Tests. **Mary S. Farquhar, Boston University.** — This study attempted to determine the value of a battery of imitative articulation and auditory discrimination tests in predicting the speech development of two groups of kindergarten children. A spontaneous picture articulation test was administered to three hundred children and the results were scored according to the Wood Articulation Index. The 50 children who had misarticulated one sound in at least two positions and had the higher Articulation Indices were selected to represent the "mild" type of articulation defect. The children who had the 50 lowest Articulation Indices were chosen to represent the "severe" type of articulation disorder. Tests of imitative articulation and auditory discrimination were administered to the children for each sound misarticulated. Imitative articulation ability was secured by examining the child's ability to imitate the correct form of a misarticulated sound in isolation, nonsense syllables and words. Auditory discrimination ability was determined by discrimination tests of the correct form of a misarticulated sound among vowels, acoustically dissimilar consonants and acoustically similar consonants. Seven months later the two groups were retested by the spontaneous picture articulation test. The amount of articulation improvement for the "mild" and "severe" groups was highly significant although no child in the sample had received speech therapy during the school year. The results of this study indicate that children with "severe' speech problems have significantly inferior ability in imitative articulation and in some areas of auditory discrimination than children with "mild" speech problems. The results also indicate that the ability to imitate the correct form of a misarticulated sound in nonsense syllables has prognostic value.

Stimulus-Response Method in Articulation Therapy. **Donald Rampp, Northeastern State College, Tahlequah, Oklahoma.** — The purpose of this study was to evaluate several aspects of the stimulus-response technique employed in therapy for articulatory disorders. This study was concerned with the effects of the following three aspects on the speech responses of defective-speaking children: (a) auditory and auditory-visual stimulation, (b) one and three stimulations, and (c) two-second and four-second periods of latency after stimulation. Forty children with functional articulatory disorders served as subjects for this study. They listened to 12 nonsense syllables that appear frequently in speech communication. The subjects were divided into four groups of 10 children each as to age, IQ, and number of defective sounds. Each subject received two conditions on two separate days; thus, each child reproduced 24 nonsense syllables. Their responses were recorded, randomized and played to 12 listeners. The total number of correct responses for each child as judged by the listeners, served as the criterion in this study.

The data were tested by means of a triple classification analysis of variance.

The results of the analysis indicated that there was no statistically significant difference between auditory and auditory-visual stimulation, or between one and three stimulations, or between a two-second and a four-second period of latency after stimulation.

A formula for critical difference was applied to compare a pair of individual means of a single factor at a single level of the other two factors. No statistically significant difference was found between any of the four-cell means under any two conditions. However, higher mean percentages were obtained when the auditory-visual condition was used. Auditory-visual stimulation with three stimulations and a four-second latency after stimulation revealed the highest mean percentage.

A Comparison of Two Approaches in the Treatment of Functional Articulatory Defects. **Catherine H. Zimmer, The University of Wisconsin, Milwaukee.** — This study was directed toward further clarification of the role of auditory training in the treatment of functional articulatory defects. It undertook

to compare the efficiency of a therapeutic approach which was exclusively an intensive program of auditory training with an approach which minimized auditory aspects of training and relied upon other sensory avenues and such other conventional techniques as phonetic analysis and analogy. (The former approach was identified in the study as the Auditory Training Method, the latter as the Combined Method). The experimental design involved twenty-five matched pairs of functional articulatory cases from four public schools in Chicago. All subjects were Caucasian, and all had normal hearing and intelligence. None had received speech therapy prior to the time of this study. The pairs were matched as to sex, age, grade, intelligence, stimulability, and speech. Groups of four subjects each were organized for therapy (many children received therapy who were not included in the study). Two sessions of twenty-five minutes were held weekly for each group for twenty-two weeks. After completion of the period of therapy, comparisons were made of the amount of improvement shown by the Auditory Training Method Group and by the Combined Method Group. In addition, the possibility of correlation between effectiveness of method and other variables such as age, intelligence, and skill in auditory discrimination was investigated.

T 18—CONTRIBUTED PAPERS IN EXPERIMENTAL PHONETICS II

Measurements of the Vocal Folds During Changes in Pitch. **Harry Hollien, University of Wichita and Institute of Logopedics, and Paul Moore, Northwestern University.** — This investigation had a dual purpose, (a) To obtain additional data concerning the relationship of vocal folds length to vocal pitch variation, (b) To investigate the comparative length of the vocal folds during phonation and at rest (i.e., when completely abducted). Subjects were six adult males selected on the basis of age, ability to expose their folds during indirect laryngoscopy, ability to phonate specified frequencies, freedom from laryngeal pathology and lack of formal singing training. The procedure required that each subject expose the entire antero-posterior length of the folds while phonating the notes C, E, and A within each octave of the subject's total singing range. The photographic procedure employed permitted enlarging each photographic image to exact life size for measurement. The results of this study permit the following conclusions. Length of the vocal folds increases systematically with rise in vocal frequency throughout the normal voice registered. The vocal folds at rest, i.e., in the abducted position, have their greatest total length. Whenever the folds are adducted for phonation, they are contracted.

Operant Control of Non-Fluent Speech in Normal Talkers. **Robert C. Bilger and Charles E. Speaks, The University of Michigan.** — This investigation represents an attempt to demonstrate that non-fluency in normal talkers can be brought under operant control. Ten subjects read aloud from prepared material. The subjects monitored their speech through earphones. A discriminative stimulus (green light) was introduced. After five seconds, an aversive stimulus (a tone of 3 kc at an SPL of 110 db.) was introduced into the earphones. The discriminative stimulus was maintained during the presence of the aversive stimulus. Fifteen seconds after the onset of the aversive stimulus, delayed auditory feedback was introduced. Audible non-fluency led to immediate removal of the aversive stimulus, discriminative stimulus, and delayed auditory feedback. A regular schedule of reinforcement was maintained. Any non-fluency occurring after the onset of the discriminative stimulus was reinforced. Delayed auditory feedback was not employed consistently after the first trial. Because the experiment followed a regular, temporal schedule, subjects tended to anticipate the onset of the discriminative stimulus. Anticipatory responses that occurred within a five-second interval directly preceding the onset of the discriminative stimulus were reinforced. The measures of operant control were: (1) time between onset of the discriminative stimulus and audible non-fluency, and (2) changes in the number of non-fluency occurrences per unit of time. The results of this investigation indicate that removal of an aversive stimulus contingent upon non-fluency affects the subject's speech behavior in at least two ways. First, the time between onset of the discriminative stimulus and the moment of non-fluency was significantly decreased. This decreased the necessity for introducing delayed auditory feedback as the experiment progressed. Secondly, the rate of non-fluent moments increased as the experiment progressed. The data obtained from this study indicate that non-fluency in normal speakers can be established as an operant.

Frequency Breaks (Voice Breaks): Their Description and Perception as Rough/Harsh Voice Quality. **Robert J. Duffy, Stanford University.** — Measurements of vocal pitch characteristics of 11-, 13-, and 15-year-old female normal speakers ($N = 24$) were obtained using a standard phonellegraphic technique on oral readings of a passage of factual prose. In addition to the standard measures of variability and central tendency of fundamental frequency, the number, extent, and location of frequency breaks were obtained. These frequency breaks are the same phenomena previously and more commonly designated as "voice breaks" and reported in the fundamental frequency measurements of 7- and 8-year-old male and female speakers and 10- and 14-year-old male speakers. This study was concerned with an investigation of the perceptual character of these frequency breaks. The entire recorded speech sample of each subject was presented to five experienced listeners who were instructed to mark on printed copies of the reading passage those syllables or words on which they perceived either or both of the following phenomena: (a) "sudden shifts in pitch about an octave in extent of the type commonly associated with male adolescent voice change"; (b) a "roughness" or "harshness" of voice quality which was demonstrated by the experimenter. The listener judgments were then correlated with the fundamental frequency record of each subject. The listeners (at least three of the five) identified a total of 55 instances of rough/harsh voice quality; but they identified *no* instances of "pitch breaks." Of the 216 frequency breaks (voice breaks) identified in the fundamental frequency analysis, 22 correlated with the instances of perceived rough/harsh voice quality; the remaining 33 instances of perceived rough/harsh voice quality did not correlate with any of the 216 frequency breaks as determined by the phonellegraphic measurements. The data apparently demonstrate that frequency breaks (voice breaks) are often perceived by listeners as a rough/harsh voice quality, but they are not perceived as pitch breaks or the "cracking of the voice" associated with male adolescent voice change as has been previously assumed. Factors other than sudden shifts in fundamental frequency, but which tend to occur with very sudden shifts in fundamental frequency, contribute to the perception of rough/harsh voice quality.

On the Predictive Validity of Phonemic Classifications System. **Ronald W. Wendahl and Kathryn Horton, Vanderbilt University School of Medicine.** — Four equivalent lists of CVC nonsense syllables comprising twelve consonants appearing an equal number of times in both initial and final positions with three vowels were recorded with the following frequency response characteristics: (a) flat (within the limits of the recording reproducing equipment); (b) 1000 cps low-pass filter; (c) 800 cps low-pass filter; and (d) 600 cps low-pass filter. The twelve consonants representing an equal number of voiced and unvoiced cognates, stops and continuants, and grave and acute members were combined with each of three vowels as follows: /i/ diffuse and acute; /æ/ compact and grave; /u/ diffuse and grave. The lists were presented in a sound-isolated and treated chamber to twenty-four subjects. The order of presentation was based on a balanced latin square in order to control sequential and practice effects. Analysis of the data supports the assumptions involved in a distinctive feature analysis which, with certain notable exceptions, better predicts perceptual responses under the above filter conditions than classifications based on voicing, manner, and place of articulation. Other factors such as closure duration, magnitude of transitions, onset and offset characteristics, and the relative duration of the phonemes within an utterance also appear to operate to affect consonant perception.

The Recognition of Frequency Commuted Speech. **William R. Tiffany, University of Washington.** — It has been adequately demonstrated that improvement of the intelligibility of speech for listeners with extreme high frequency losses cannot be accomplished through any such simple means as "boosting the highs." Hearing physiologists have shown that in end-organ hearing loss the receptors in critical frequency areas of the cochlea may be damaged beyond recovery or repair. The clear implication of the above fact is that improvement of intelligibility in the case of end-organ impairment must be accomplished through the more effective use of remaining receptor units and that the attempt to force the damaged units to respond through amplifications is doomed to failure. What may not be so clear, but may also be true, is that the attempt to amplify may have secondary effects which further decrease intelligibility, perhaps through the overdriving of partially impaired auditory structures, the introduction of distortion products or the further limitations of the frequency response "dimension" of hearing. It might be hypothesized that if the frequency response of the ear cannot be brought into the range necessary for the adequate reception of speech signals (roughly 300-300 cps) it might yet be possible to commute the frequencies of the speech downward within the range of at least some impaired ears. It was the purpose of the present study to determine the intelligibility of speech thus commuted. Much recent evidence has demonstrated the importance of the first two vowel formants to speech intelligibility—not only in the case of vowels themselves, but also in the case of consonants, as they function through resonance *changes*. Additional evidence seems to show, moreover, that it is the *relative* rather than the *absolute* formant positions which are most important to recognition. Thus, commuting the overtones of speech downward by equal amounts, while changing the absolute formant frequencies, and therefore the perceived "quality" of the speech, may not influence *relative* frequency position and thus may not grossly disturb recognition. Another way of putting this idea is to say that if the acoustic vowel diagram *shape* (rather than *size*) determines intelligibility it should be possible to produce frequency-commuted speech which occupies a different portion of the frequency spectrum but which still retains good intelligibility through the retention of acoustic vowel diagram shape. It is possible that we may bring the frequency commuted speech into the range of normal reception by end-organ impaired ears, even though we may not bring the ears into the range of the speech. To investigate the general problems posed by the above hypothesis several experiments have been planned: (a) the determination of the intelligibility of vowels commuted various degrees—lowered in the frequency of all partials equally by 20, 40, 60, 80, 100, and 120 per cent; (b) the determination of the relative effects of such frequency distortion on male vs. female voices; (c) the determination of the extent to which such frequency distorted speech can be *learned* by normal listeners even when distorted to the extent that it is not immediately intelligible; and (d) the determination of the intelligibility of such speech for persons with end-organ high frequency hearing losses. The first three stages of this experimental inquiry have been completed and were the subject of this report. Recorded speech samples of two male and two female speakers were played back to 14 groups of 4 listeners each at reduced playback speeds to provide for recognition scores at frequency communications of from 20 to 120 per cent. Scores derived for the various frequencies, vowels, and sexes showed good agreement with hypothesized outcomes.

T 19—PROBLEMS OF APHASIA REHABILITATION IN THE MEDICAL SETTING

Speech Therapy for the Adult Aphasic in the Hospital Setting. **Daniel R. Boone, Highland View Hospital, Cleveland.** — Language retraining of the adult aphasic can best be accomplished when the total rehabilitation needs of the patient are met. Speech therapy for aphasics in a rehabilitation hospital is described, with particular attention given to the speech pathologist's problems of referral, aphasia testing and screening, acceptance or non-acceptance of cases, amount and type of therapy, and post-hospital therapy and vocational planning. An analysis is given of the treatment and progress of over 300 aphasics who had received speech therapy during a three year period in a hospital clinic. Upon hospital discharge, each patient was given a progress rating, comparing level of observable language functions at time of initial testing with functions found at time of hospital discharge. These progress ratings were then related to such variables as age, sex, length of time since onset of aphasia, amount of therapy given, progress in other therapies, etc. Typical findings were that patients beginning speech therapy two years after onset can still make speech improvement; that intensive speech therapy (three hours daily for selected cases produces significant improvement); and that severe persisting language problems are in themselves no contra-indication to success in other rehabilitation activities, such as learning to walk and achieving independence in self-care.

The Clinical Psychologist Evaluates Aphasia Rehabilitation. **Stephen L. Fink, Western Reserve University.** — The problem of aphasia is essentially a problem of disturbed communication. Therefore, the aphasic must be looked at as a person whose ability to relate himself to others, and to his world in general, has become disrupted. It is a problem which involves more than just the area of speech; it involves the total expression of the individual's personality. The strength of the team approach lies in the fact that it provides the best possible framework for evaluating the different facets of the individual's personality in that it can offer the means for assessing a person's various modes of expression and communication. There are three inherent weaknesses in the team approach: (1) the danger that the definitions of the roles of the team members may become too rigid and may lead to a technique-oriented rather than a person-oriented approach to treatment; (2) the team approach may easily be carried to the absurd extreme where it is assumed that every team member must play a part in the treatment of every patient, whether or not that treatment is relevant to the particular case; and (3) it may dilute personal contact with the patient and, thereby, prevent the development of close patient-therapist relationships where such relationships are essential to treatment.

Physical Medicine Approaches the Problem of Aphasia. **Charles Long, Highland View Hospital, Cleveland.** — Aphasia therapy is a highly specialized subsection of speech therapy. As such, it requires a deep degree of knowledge on the part of the physician and the therapist concerning the intricacies of organic brain damage. The degree and type of supervision or control exercised by the referring physician varies with the numerous different types of facilities in which aphasia therapy is practised, and will continue to so vary in the future. We are concerned particularly with the relationship of the speech therapist to the physiatrist, and the rehabilitation process in general. We are assuming it is agreed that a physician should prescribe speech therapy, should supervise and direct this therapy, and should decide when therapy is no longer useful or has attained its original aim. Among physicians, the physiatrist is best trained to evaluate aphasics for speech therapy, prescribe that therapy, and direct therapists. He has a firm foundation in neuromusculoskeletal physiology, and is experienced in dealing with therapy problems in physical therapy and occupational therapy. Qualified direction from the standpoint of neuromuscular physiology can certainly be given by the neurologist or by the neurosurgeon. Theoretical considerations must always give way to the practical needs of the therapist in establishing his own sphere of influence as an aphasia specialist. Undoubtedly, as the individual physiatrist works throughout the years with the individual, experienced speech therapist, the actual details of direction become more an more the sphere of the therapist. In the long run a fruitful relationship between physician and therapist depends upon the maturity of the individuals involved in learning from each other.

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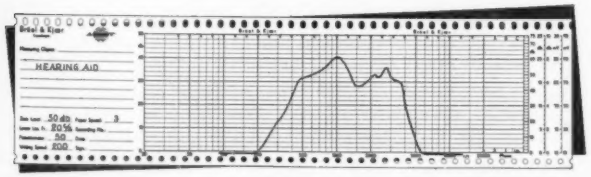

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FRIDAY, NOVEMBER 13

F 2—MEASUREMENT OF HEARING OF CHILDREN

Play Audiometry with Brain-Damaged Children. **Elizabeth A. Brown, School for Cerebral Palsied Children, Altadena, California, and Kenneth J. Knepflar, University of California at Los Angeles.** — The fact that it is difficult to test the hearing acuity of very young children has long been recognized by audiologists and audiometrists. Discussions of special techniques of play audiometry to facilitate such testing have appeared in the literature during recent years. The special problems of evaluating the hearing of brain damaged children with various combinations of neuromuscular, intellectual, visual, auditory and emotional impairments, however, have received very little attention. Special adaptations of old ideas and the development of new techniques have resulted in the successful completion of audiologic evaluations of severely multiple handicapped children in the course of differential speech and hearing diagnosis at the School for Cerebral Palsied Children, Southern California. Because of hyperactivity, distractibility, poor spans of attention and concrete attitudes often seen in brain-damaged individuals, standard methods had proved unsuccessful with many of the children enrolled in the school. The development of a simple 10-inch square, wooden box with a 2¾ inch hole cut in the top and a light inside has aided greatly in the testing of these children. The testing room is darkened so that attention is focused on a single visual stimulus, the light. The child is handed a bead which he holds next to the earphone until the auditory stimulus is given, at which time he drops the bead into the box. Often no verbal instructions are given. The tester merely illustrates, prior to giving the bead to the child. Variations of this technique such as shifting the order of presentation of pure tones, changes from one ear to the other at a given frequency, length of the testing period, amount of conditioning, and changes of the play activity during a given situation which have been necessary with various cases, are discussed. Additional techniques which have been used with children with little or no hand-usage, those with severe mental retardation and blindness will be presented to illustrate the necessity of adapting the test situation to the needs of each patient. It is felt that the primary contribution of these techniques has been increased success in including or excluding auditory problems as factors in explaining the severe speech and language retardation found among many young brain-damaged children.

Limited Pure-Tone Sweep-Check for Elementary School Children. **Lois Copenhaver and Peter A. Campanelli, D. C. Department of Health.** — This is a report of the sweep-check screening of 4393 children enrolled in the fourth grade of 38 elementary public schools of the District of Columbia by eleven trained audiometrists using factory calibrated and clinically-checked Maico MA-2 audiometers. The frequencies 125, 250, 500, 1000, 2000, 3000, 4000, 6000, and 8000 cps. were employed at a sweep-check intensity level of 20 db re: minimal acuity responses in the particular school setting. Failure criterion was a response above the 20 db level in either ear in one or more frequencies. All children were tested individually. With these frequency and intensity levels, 327 children did not meet the pass-fail criterion. This "fail" group consisted of 183 males and 144 females, of which there were 267 negro and 60 white; their mean age was 10 years, 5 months. Statistical analyses of the audiometric records of these 327 children were computed in collaboration with the Department of Biostatistics of the Health Department. The results of these analyses on this particular population indicated that: (1) The use of the single pure tone frequency of 4000 cps. would have accounted for only 64.8 percent of those failing the test criteria. (2) The use of the combined test frequencies 1000, 4000, 6000, and 8000 cps. would have been the most efficient in screening out 96.4 percent of the 327 children who did not meet the pass-fail criterion. (3) The grouping of pure-tone frequencies according to their ability to screen-out failures was as follows: (a) 125, 250, or 500 cps.—nonsignificant. (b) 400 cps.—64.8 percent failed. (c) 4000 plus 6000 cps.—87.2 percent failed. (d) 4000 plus 6000 plus 8000 cps.—91.4 percent failed. (e) 1000 plus 4000 plus 6000 plus 8000 cps.—96.4 percent failed. Our conclusions, based on a comprehensive pure-tone sweep-check screening survey of this particular fourth grade population, are that: (1) the use of a single pure-tone frequency would have been grossly inefficient; (2) the use of the combined pure-tone frequencies of 1000, 4000, 6000, and 8000 cps. would have been effective in detecting 96.4 percent of the failures; (3) more children may be tested in the same period of time when noncontributory frequencies are eliminated; and (4) because of the high frequency components, there is less chance of ambient noise causing spurious responses.

Mass Screening of 4,000 Pre-School Children with Filtered Familiar Sound. **Marion P. Downs, University of Colorado Medical School.** — Following a pilot study on the use of filtered sounds in the testing of pre-school children, 4,000 three- to five-year-old children have been tested in the Denver Public Pre-School program in the past eighteen months. A new technique was attempted, that of recording the filtered sounds on tape and presenting them with attenuation in the tape. The testing was done through earphones after the output had been measured at the earphone. The procedure was to orient each child at a 50 db. level, and then to give a test presentation at a 15 db. level. Inability to identify any of the sounds in either ear constituted a failure, and the child was rechecked and then given a threshold audiogram. The program was undertaken by a volunteer group from the Junior League of Denver, and recheck audiograms were conducted by the Denver Hearing Society audiologists. Ninety-eight per cent of the children tested cooperated in the test, and what was considered to be a satisfactory screen was obtained. Five per cent were found to have significant losses after the final threshold audiograms were made. The criteria for designation of failure were either a 15 db. loss at one frequency or more, and/or a 15 db. difference between air and bone conduction. This latter criterion was established as a result of the findings in the pilot study which indicated that this aged child can be expected to have –10 or better hearing, and therefore a 5 db. loss by air conduction would be a significant loss if –10 bone conduction thresholds prevailed. A further breakdown of the findings reveals the following distribution: 20%-nerve loss, mainly in high frequencies, 80%-conductive loss, 50%-high frequency conductive loss, 48%-flat conductive loss, 2%-low frequency conductive loss. The breakdown of conductive losses suggests some interesting conclusions. Fifty per cent of these losses were high frequency conductive losses, indicative of what has been termed a "mass tilt" type of audiogram. The high frequency tilt is customarily interpreted to indicate the presence of mass in the middle ear. This fact would point to the idea that 50% of the conductive-type losses in children of this age may be caused by a serous or gelatinous mass in the middle ear. The implications here are considered significant.

Auditory Responses of Infants. **Janet B. Hardy, Anne Dougherty and William G. Hardy, The Johns Hopkins Medical Institutions.** — As part of a general study of infantile development, three groups of children (502 in all) were studied in reasonably well-controlled circumstances. The relationship between different stimuli and various responses composed the basic data. Among these children were 64 neonates, 4 hours to 5 days of age; 348 infants were between 3 and 30 weeks; and 90 were between 30 and 52 weeks. The majority of the babies were examined in regular well-baby clinics of the East Baltimore Health Department. The general object of the study was to standardize infantile auditory responses in a 1-month scale from 4 to 52 weeks. Twelve stimuli were employed, and some 15 kinds of response were observed. The nature of the response to a particular stimulus is apt to vary considerably in the age-range between 16 and 28 weeks. The equipment and the responses are discussed, and some generalizations are made with regard to normal infantile behavior. A few deviant

findings are mentioned. These screening tests give promise of good effectiveness as a general public health measure for use with infants over 6 months of age. They are quite effective as a special test in the hands of well-trained personnel for infants in the range between 1 and 6 months.

Use of the Pure-Tone Peg-Board Operant Conditioning Technique in Testing the Hearing of Young Children. **George S. Haspiel, Pennsylvania State University, and Elliot Zinner and Edward Grat, State University of New York, Geneseo.** — Because of various problems attending other types of audiometry with the young child, we have concentrated on peg-board operant conditioning techniques for testing the hearing of the very young child (preschool and primary grades). Equipment: (1) blank white peg-board, 6″ x 12″, containing 72 ¼″ diameter holes. (2) 72 ¼″ pegs for each of the primary colors, red, blue, yellow, black. (3) commercial AC audiometer. (4) peg trough containing all the pegs (scattered in random order). Procedure: (1) instructions given to child orally and pantomimed. (2) tones 125 cps-8000 cps given monaurally using ascending-descending technique. (3) colored peg selected by child and placed in hole when tone is presented. (4) two pegs taken away from child if peg is placed without tone. Study: A series of air conduction audiograms were given to 20 normal young children with an age range of 4-7 years in which the peg-board operant conditioning technique was used. After a period of 5-7 months, repeat peg-board audiograms were obtained on the same population. Reliability coefficients obtained reveal significant correlation between 1st and 2nd audiograms.

F 3—ARTICULATION TESTING

The Standardization of a Speech Articulation Test Procedure with the Use of a Colored Picture Filmstrip. **Lucile Cypreansen, University of Nebraska, Lincoln, Nebraska.** — *Purpose of the Study:* To provide a more objective method of studying, recording, and comparing the speech articulatory differences of children. In checking the young child's ability to produce sounds and combinations of sounds in words, a variety of unstandardized procedures and materials have been used in speech clinics over the country.

Procedure: The preparation of a colored standard 35 mm. filmstrip of 82 pictures was prerequisite to this research. The 82 pictures finally selected were chosen from over 150 pictures which were presented to thirty kindergarten children in the University of Nebraska elementary demonstration school. The pictures were colored chalk drawings prepared by artists in the Photographic Laboratories at the University. Ten colored filmstrips were made of the selected pictures. These pictures were planned to solicit word responses which would check the child's ability to produce the consonant sounds in three positions, initial, medial and final. The vowel and diphthong sounds were checked by one picture each.

A Teacher's Manual which was prepared gave specific directions for the presentation of the filmstrip test and for recording word and sound responses.

The Filmstrip Speech Articulation Test was then presented to 500 kindergarten children in the public schools of Lincoln, Nebraska. A standardized procedure of presentation was adhered to at all times. The examinations were all carried out by the above-named investigator. A record was kept of each word response given by each child. The investigator wished to discover the reliability of the word responses: to what degree did the children tested give like word responses to the 82 pictures presented on the screen?

The research required a standardization of the test procedures and a statistical evaluation of the reliability of the word responses.

The Teacher's Manual and the colored filmstrip will be made available to speech clinics and speech therapists. The University of Nebraska Research Council has provided a grant of $500.00 for this project.

The Use of Narrow Phonetic Transcription in Diagnosis and Prognosis of Articulatory Defects. **William H. Plotkin, Speech and Hearing Center, Illinois Eye and Ear Infirmary, Chicago, Illinois.** — The symbols of the International Phonetic Alphabet have been used consistently by speech pathologists to describe defects of articulation. Numerous articulation tests have been devised, each with a particular purpose and each with some value as a diagnostic tool. Some authors have reported that the type of stimulus material used to elicit responses from a subject can be of importance in predicting the success of therapy. However, use of phonetic symbols has usually been limited to recording errors of substitution.

It is the contention of the writer that the articulation test used in assessing a child's speech problem is not nearly as important as the phonetic skill of the tester. Rarely have distortions been transcribed; or, if they are listed, usually the closest phonetic approximation has been given.

This paper utilized appropriate visual materials to show how narrow phonetic analyses can present a complete picture of an articulation defect. Error patterns, such as low-point sibilant production, may become evident and indicate the underlying reason for a number of substitutions. Velar, mid-palatal or other patterns frequently emerge as the major difficulty of many subjects. Most speech therapists are not enough aware of the intricacies of narrow phonetic transcription, and yet the planning of a therapy program can be based in large part on an initial articulation test. The function of repeated tests can be to improve evaluation of progress, since correction of a sound is no longer a requirement for improvement.

Rationale for a "Deep Test" of Articulation. **Eugene T. McDonald, The Pennsylvania State University.** — This paper integrated work in physiologic and acoustic phonetics to produce a set of theoretical constructs about the nature of articulation. Articulation is defined as the process by which varying degrees of obstruction are placed in the way of the outgoing air stream and the size and shape of resonating cavities are modified. These obstructions and cavity modifications are produced by a series of overlapping ballistic movements of the speech musculature. The audible phonomena (speech phonemes) produced are highly variable with their characteristics influenced by the phonetic environments in which the phonemes occur. Articulation ability in the individual develops through the interaction of sensory and motor processes as a function of time. Variability in articulation decreases as maturation progresses, yet a high degree of variability always is present in speech. Assessment of articulation requires an adequate and representative sampling of a person's articulatory behavior. The usual test with phonemes in initial, medial and final positions in words or syllables does not provide a representative sample. A test which permits the systematic evaluation of a patient's ability to produce representative overlapping movements yields more exact information about speech development and the symptomatology of defective articulation.

Use of a "Deep Test" of Articulation for Diagnosis and Prognosis. **Asa J. Berlin, Pennsylvania State University.** — Two forms of deep test, the sentence and picture types, were described. The deep test method of evaluating articulatory proficiency has been used in several studies of children in developmental stages of articulation mastery and in studies of children with articulation defects. The performances of kindergarten children on deep tests and the more traditional three-position tests of the [s], [r], and [l] sounds have been compared by Dorsey. Although there were significant correlations between the mean number of correct responses on the deep test and the number of words with correct articulation in the three-position test, prediction of individual performance by the three-item test was poor. The deep test demonstrated the significant variability among children who performed the same way on the traditional test. The deep test has been used to study some variables in the symptomatology of articulation problems in the first four grades. It has been useful in demonstrating possible relationships among age, consistency of errors, types of errors, and consistency of error types. Relation of phonetic context to errors and specific error types has been studied. Throughout all studies there appear to be meaningful differences in patterns of articulation errors related to specific phonemes. The deep test has also been used as a more dis-

criminating instrument for comparing the effects of maturation and therapy on the articulation of first graders, and the effect of a period of rest on gains made in therapy. Patterns of future research in the validation, refinement and application of this testing method were described.

F 6—CLEFT PALATE RESEARCH

The Relationships Among Nasal Voice Quality, Speech Intelligibility, and Articulation. **J. Matthews, G. H. Shames, and A. Savoye, University of Pittsburgh.** — It was the purpose of this project to study the relationships among nasality, articulation proficiency, and intelligibility in the speech of cleft palate adults. The study of these variables is dependent upon valid and reliable measures of the dimensions of speech. Although valid and reliable measures of articulation and intelligibility are available, such instruments are not available for the measurement of nasality. Nasal voice quality has been receiving much attention in the health professions because of its importance as a criterion for evaluating rehabilitative procedures for cleft palate patients. The alleviation of nasality in speech has become a major goal in dealing with this problem. The study of the relationships of intelligibility with nasality and articulation may provide some evidence of the validity or lack of validity of such rehabilitative procedures. The first phase of the project was the development of an instrument for measuring nasal voice quality. It was our purpose to develop scaled tape recordings which would contain varying degrees of nasality. Different scales were developed for men and for women. By recording the speech of 100 male adults and 100 female adults representative of the continuum of nasality, and randomly presenting the data to trained judges for ratings, five levels of nasality were identified, each having a quantitative value. These scales were then tested for reliability and validity on various clinical populations. The judgments of nasality were made by employing the method of playing the tapes backwards in order to eliminate the factors of articulation and intelligibility from the judgments of nasality. Following the development of these scales, measures of articulation proficiency were derived from the same subjects used in the development of the nasality scales. These articulation measures were based on speech elicited through the reading of sentence lists containing all of the consonants in American English. Professionally trained judges analyzed these sentences for articulation errors. The intelligibility of the subjects was measured through the "write-down technique" whereby listeners would write down what they thought they heard on the tape recordings of these subjects. The above procedures result in an articulation score, a nasality score, and an intelligibility score for each subject. Correlations were computed among these three variables. In addition, an attempt was made to determine whether nasality could best be measured by the reading of a paragraph, the reading of sentences, or the reading of isolated words.

Articulation Skills, Velo-pharyngeal Closure and Oral Breath Pressure of Children with Cleft Palates. **Gene R. Powers and D. C. Spriestersbach, State University of Iowa.** — The purpose of this study was to determine the relationships, if any, between some measures of oral breath pressure, some measures of velopharyngeal opening and some measures of proficiency of articulation for cleft palate speakers. The subjects consisted of 103 youngsters with cleft lips and/or palates ranging from five through fifteen years of age. The primary articulation measurement used consisted of a ratio computed from the results of the Templin articulation test which reflected the individual's performance as compared to his normal peers. The measures of oral pressure were taken with the nostrils open and occluded from a wet spirometer and an oral manometer. Ratios were computed in both cases between the measurements with the nostrils open and occluded and were used as an indication of adequacy of oral breath pressure. Thus, three ratios were computed: the Templin ratio, the wet spirometer ratio and the manometer ratio. X-ray data were also obtained for each subject and the degree of velo-pharyngeal opening was determined. Correlational procedures revealed that the wet spirometer ratios and the manometer ratios were significantly related. Significant, although rather weak, relationships were also found between both of these ratios and the measures of articulation proficiency and measures of velo-pharyngeal opening obtained from the lateral head X-rays. Analysis of the data indicated that a high articulation ratio was almost invariably accompanied by high pressure ratios. However, the reverse was not true, that is, high pressure ratios were invariably accompanied by high articulation ratios. These findings emphasize that factors other than inadequate pressure may account for poor articulation. A great deal of individual variability was observed on all of the measures that were employed. Nevertheless, almost without exception, subjects who were unable to develop adequate oral pressure show marked deficiencies in articulation proficiency. The individual variability argues for many different kinds of observations. Pressure measurements in conjunction with X-ray and articulation data should be useful in identifying the factors involved in speech problems and thus make possible more intelligent planning for future management.

Velo-Pharyngeal Movements and Tongue Carriage During Speech in Adults With Unrepaired Incomplete Cleft Palates. **McKenzie Buck, University of Florida.** — Speech pathologists have long been interested in the velo-pharyngeal closure because of the relationship believed to exist between the completeness of this closure and nasal voice quality. Thus far, the majority of research in this area has concerned itself only with repaired tissues. Previous experimental evidence seems to indicate that the degree of nasality is more dependent upon the extent of velo-pharyngeal opening than any other factor thus far measured. There have been strong suspicions that retarded maxillary growth, frequently observed in surgical cases, may have a marked effect upon voice quality and articulatory placement. The speech of thirty-five Puerto Rican patients ranging in age from 15 to 57 with unoperated incomplete palatal clefts was analyzed. The research was sponsored by the Division of Dental Public Health, Washington, D. C. As in the complete cleft palate group, facial growth and development appears to have progressed on a normal pattern. The x-ray plates of the production of vowels, rest position, and A-P views show normal facial growth development. It appears that the smaller the cleft opening, the more nasal the speech production. The hearing tests in this group indicate normalcy and are quite superior to those of individuals who have had early palatal repair in the United States.

Velo-pharyngeal Function and Intelligibility of Speech. **Joanne D. Subtelny, Orthodontic Department, Eastman Dental Dispensary, Rochester, New York.** — The purpose of the study was to investigate the relationships between intelligibility of speech and velo-pharyngeal function. In order to secure the necessary data, high fidelity tape recordings of sustained vowels, continuous speech, and intelligibility tests were accumulated for 70 cleft palate adults. Simultaneously, with the recording of sustained vowels, cephalometric films were secured. Tracings were made of the films and measurements of velo-pharyngeal opening were made between the posterior aspect of the velum and the anterior margin of the posterior pharyngeal wall at the point of maximum constriction during phonation of the vowel [u].

Intelligibility test material consisted of the PB word lists and/or 48 nonsense syllables. Utterances were recorded at 5 second intervals. Tapes were played to a panel of three speech pathologists for phonetic identification of the intelligibility test items, and for voice quality and articulation ratings of the continuous speech samples. Percentage loss of intelligibility for word-syllable articulation and for plosive, fricative and glide articulation was determined on the basis of listener responses. Respective intelligibility measurements were then correlated with the measurements of velopharyngeal opening.

The correlation coefficient obtained for word-syllable intelligibility was +.57. Respective correlations for plosive, fricative and glide intelligibility were +.51, +.21 and +.35. With the exception of the r obtained for fricative intelligibility, correlations were found to be statistically significant beyond the 1% level. An increase in anteroposterior dimensions of the velopharyngeal opening was found to be significantly related to an increase in percentage loss of intelligibility on word-syllable, plosive and glide articulation. Measurements of fricative intelligibility were not found to be significantly related to the degree of velopharyngeal opening.

The McDonald and Baker hypothesis, that there is a critical degree of velopharyngeal opening beyond which speech is severely distorted, was considered within the reference of these data. Clinical implications were discussed with particular consideration given to functional evaluations of the velopharyngeal mechanism based upon cleft palate speech analyses.

F 7—THE HASKINS SPEECH RESEARCH: PROGRAM, METHODS, AND RESULTS

The Haskins Speech Research: Program, Methods, and Results. **Franklin S. Cooper, Alvin M. Liberman, George N. Scholes, Katherine S. Harris, Haskins Laboratories, New York City.** — Speech research at Haskins Laboratories has been largely concerned with isolating the acoustic cues on which the perception of speech depends. Various methods have been used, of which the most flexible and convenient has been the synthesis of speech from hand-painted spectrograms. Much remains to be learned about the number and nature of the acoustic cues, but it is felt that the important dimensions have been found. Indeed, enough is known to permit the synthesis of reasonably intelligible speech from a small number of formal and explicit "rules."

Information gained from the search for acoustic cues has suggested and supported certain speculations about the nature of the mechanism of speech perception. These include an hypothesis about the role of sensory feedback from articulatory movements, and have led several workers at the Laboratories to try to learn more about articulation by making electromyographic measurements.

The same speculations suggest, as do other considerations, that a listener's discrimination of a given acoustic difference should, as a result of learning, be better across a phoneme boundary than within a phoneme category. Research on this problem indicates that such an effect does occur, and that its magnitude is, in some cases, so great as to make the perception of speech essentially categorical.

Research on the perception of isolated cues for the various phonemes indicates the existence of rather large differences among individuals in sensitivity to the several important acoustic dimensions. Such data may find practical application through a better understanding of speech and hearing difficulties.

F 10—POST-LARYNGECTOMY SPEECH

A Cineradiographic Study of the Pseudo-Glottis in Post-Laryngectomized Speech. **William M. Diedrich and Karl Youngstrum, University of Kansas Medical Center, Kansas City, Kansas.** — The present study shows differences in the size, shape, and movement of the pseudo-glottis in post-laryngectomized speech. The cineradiographic films were taken with a synchronous pulsed X-ray at 15 pulses per second. A 16 mm camera with simultaneous magnetic sound was used for recording the image framed by a 4½ inch Philip Intensifier. Patients are shown counting, saying vowels and sentences. An attempt was made to evaluate the swallowing, inhalation and pa-ta-ka maneuver, but so far the results are inconclusive. Selected cases showed diaphramatic movement for each syllable-breath and differences in the esophageal reservoir.

A Comparative Sound Analysis of Certain Vowels as Produced By Esophageal and Normal Speakers. **Margot Shaski Keller, St. Rita's Hospital, Lima, Ohio.** — This study analyzed six vowel sounds, [i], [æ], [ʌ], [ɑ], [u], and [ɔ], as produced by 16 speakers using the normal speech mechanism and 16 laryngectomees using esophageal speech. Tape recordings of the sounds produced by each speaker were analyzed through an audio-frequency spectometer and graphic level recorder. Comparisons of relative intensities, frequency band widths and overtone structures were made. Normal speakers had a significantly higher intensity than the esophageal speakers at the one-third octave band widths for [i] at 125, 800, 1000, 1250 and 3200 cycles per second, for [æ] at 125, 250, 320, 1000, 1250 and 2500 cps, for [ʌ] at 125, 250 and 320 cps, for [ɑ] at 250 and 320 cps, for [u] at 125 and 200 cps, and for [ɔ] at 125, 250 and 320 cps. The mean fundamental pitch of both groups was 160 cps for sounds; sub-fundamental tones were noted. General configurations of the formant regions of the vowels of the two groups were similar, indicating likenesses necessary for intelligibility. Significant differences in relative intensities at particular band width frequencies seemed to produce voice quality variance between the groups.

Power Spectra of the Pre- and Post-Operative Speech of a Laryngectomee. **Alan C. Nickols, University Hospital, Columbus, Ohio.** — This study was undertaken to discover any systematic differences in speech power spectra between normal and esophageal voices. An esophageal speaker duplicated a pre-operative recording of his normal voice with his esophageal voice. Five eight-sound samples of each voice were analyzed. Each was transferred to a loop and reproduced through a ⅓ octave band analyzer (Bruel and Kjaer) to a power level recorder. The power in each frequency band was calculated. Results indicate that the major difference between the voices was a shift to a lower pitch in the esophageal voice. The graph of the sample averages for frequency bands shows a remarkable similarity in the speech power patterns of the two voices. Other voices, both normal and esophageal, show differing power patterns. A pattern may therefore be characteristic of an individual speaker.

Analysis of Vowels of Laryngetomized Speakers. **William F. Waldrop, St. Luke's Hospital, Chicago, and Arthur E. Toht, Electronics Laboratory, Sears Roebuck and Co., Chicago.** — The three vowels (u), (i), and (a) were sustained in isolation by laryngectomized and normal speakers. Laryngectomized subjects were chosen to illustrate each of the so-called buccal, pharyngeal, and esophageal methods of pseudo-phonation. The samples were recorded on tape and analyzed for their harmonic content. Closed loops of magnetic tape presented a continuous, sustained sample to a standard sound analyzer and graphic recorder. The resulting harmonic analyses of the vowels spoken by the laryngectomees were then compared to those spoken by normal speakers. These acoustical studies provide information which should be useful in the rehabilitation of laryngectomized patients. In general, the formants of the various vowels of the laryngectomized speakers approximated the frequencies of the same phoneme spoken by normal speakers. The closeness of approximation was in the following order: (a) pharyngeal, (b) esophageal, and (c) buccal. The fundamental pitch of the vowels of the pharyngeal speaker most closely approximated that of the normal speaker, while there was no clearly defined fundamental pitch of the buccal speaker.

Surgery and Speech for the Laryngectomee. **John J. Conley, New York City.** — Approximately 30 to 40 per cent of the postlaryngectomy patients are not vocally rehabilitated. Six per cent adopt an artificial speech device which is capable of producing a sound that is characteristically conspicuous but not similar to the human voice. The remainder of the patients utilize esophageal or pharyngeal speech methods which, in some instances are adequate, functional, and even amazing. This method of speech requires lessons, training, practice and determination, over a period of months. The fundamentals consist of controlled gulping and belching. A new operation was developed in 1955 to permit the pulmonary air to pass from the trachea into the gullet. This permits the patient to talk as soon as the wound is healed, without lessons and without gulping. Sentences are longer, clearer and more sustained. The surgical technique consists of creating a mucous membrane tunnel from the anterior wall of the esophagus, 5 cm. long, positioned vertically so that the act of swallowing automatically closes the tunnel, thus preventing a fistula phenomenon. The technique has been simplified in a recent modification of the original operation by utilizing a free vein graft to accomplish this communication. The tunnel is connected to the tracheostome by a special tracheostomy tube. Thirty patients have been operated with 80 per cent success. It is hoped that this paper will stimulate thought in this neglected field.

F 11—ARTICULATION DISORDERS

An Investigation of the Relationships of Acceptance of Self and Acceptance of Speech Correction to Improvement of Articulation. **Gerald Woolf, Manhattan Veterans Administration Hospital, New York City.** — This research studied the relationships of acceptance of self and acceptance of speech correction to improvement of articulation subsequent to a program of speech therapy. The hypotheses were derived from phenomenological theory which also determined the methodology of the speech therapy program, the measuring instruments, and the interpretation of the findings.

The data of this research were secured during a program of therapy of six months duration. The subjects included twenty-seven school-age children from seven and one-half to nine and one-half years of age. All of the subjects presented functional disorders of articulation. The speech therapy program was based upon nondirective play therapy principles and methodology. Speech correction activities were provided within the framework of nondirective principles. Measures of acceptance of self, acceptance of speech correction, and improvement of articulation were obtained at the beginning of the speech therapy program and at its conclusion.

The analysis of the data generally supported the hypotheses, but in some instances did not. Some of the findings included:

(a) At the conclusion of the speech therapy program acceptance of self and acceptance of speech correction were positively related to improvement of articulation.

(b) Change in acceptance of self and change in acceptance of speech correction during therapy were not related to improvement of articulation.

(c) Acceptance of self at the beginning of therapy is positively related to acceptance of speech correction at the beginning of therapy and to acceptance of speech correction at the conclusion of therapy.

(d) Acceptance of self at the conclusion of therapy is positively related to acceptance of speech correction at the conclusion of therapy and to change in acceptance of speech correction during therapy.

The results of this study and the phenomenological frame of reference which guided its design are considered to have significant implications for functional articulation disorders in terms of diagnosis, prognosis, and therapy.

Informational Processing Ability of Children with Articulation Problems as Compared with Normal Children. **Billie M. Thomas, Mississippi Southern College.** — The informational processing ability of children with articulation problems was compared to that of children with normal speech. Measurement was made with respect to four tasks: (a) absolute judgments of pure tones with additional coding information available to the subject with respect to the tones presented to the right and left ears, (b) reproduction of one of two simultaneously presented digit sets, (c) reproduction of the first two sequentially presented digit sets, and (d) decisions in a two-choice probability matching situation. These tasks were selected on the assumption that they relate to language learning in that they measure: (a) the child's ability to utilize all available information, (b) his ability to discard irrelevant information in response to relevant information, (c) his ability to store relevant information, and (d) his ability to match his decisions to the probability of the occurrence of events. The two groups of children who served as subjects were matched for age, sex, and intelligence level. The results indicate that children with articulation problems are significantly inferior to normal speaking children in their ability to process information.

A Rating Scale Technique for the Measurement of Foreign Dialect Based Upon Non-Contextual Material. **Elizabeth Jancosek, The Ohio State University, Columbus, Ohio.** — This study evaluated the reliability with which judges can rate degree of foreign dialect of a group of 96 international students through a scaling technique based upon the psychophysical method of equal-appearing intervals.

Four ten-second segments of the speech of international students who read from the speaker lists of the multiple-choice intelligibility test were presented to judges for rating on a nine-point scale, *one* representing least dialect and *nine* representing most dialect.

Intelligibility scores were obtained for each speaker from the responses of two panels of 15-18 listeners to the multiple-choice intelligibility tests. The Lado Test of Aural Comprehension was also administered to the international students.

An average intercorrelation by analysis of variance was applied to the mean ratings and the result was extended by the Spearman-Brown prophecy formula, yielding a coefficient of .94 for the entire panel of judges.

In order to evaluate the relationship of (a) judges ratings of foreign dialect and aural comprehension scores, (b) intelligibility scores and aural comprehension scores, and (c) intelligibility scores and judges' ratings, three Pearson product-moment correlations were computed, –.47, .44 and –.36, respectively.

Medion scale values and Q-values were computed for each item. Segments representing each of the points on the scale and having the lower Q-values (least variability) were incorporated into the final recorded series of scaled items. This recorded series of scaled items could be utilized to qualify foreign dialect for the purpose of assigning international students to remedial classes and to evaluate their improvement in such a class. Another use would be that of training clinicians or other observers in the range of foreign dialect found in American colleges and universities.

F 12—DELAYED SIDETONE

Determination of Organic Hearing Threshold by Means of Delayed Sidetone. **G. Donald Causey and Linda M. McGranahan, Veterans Administration, Washington.** — This study was designed to improve the clinical application of delayed sidetone by determining (a) minimal intensity above threshold which yields statisically significant responses, and (b) norms for judging when a positive response occurs. Normal and hard-of-hearing subjects were used. A delay of .18 second was imposed upon the recorded speech signal which was returned to the subject's ears at the intensities of 14 db, 18 db, 22 db, and 26 db above threshold. The Grason-Stadler Speech Time Analyzer provided speech-time and silent-time scores. Analysis of the results are discussed.

An Experimental Investigation of the Dichotic Application of Delayed Sidetone and Masking Noise. **Edward W. Gibbons, Veterans Administration, Los Angeles.** — The experiment involved testing 40 normally hearing and 40 organically unilaterally deafened subjects with a 30-db. difference between ears. Both groups read a prose passage 1600 syllables in length divided into 4 treatments: (1) unimpeded oral reading; (2) dichotic application of delayed sidetone and masking noise; (3) a second dichotic application reversed from the initial presentation; (4) unimpeded oral reading. Reading rates were obtained for each of the four treatments. The following effects were noted. First, oral reading rates obtained for normally hearing persons undergoing dichotic application of delayed sidetone and masking noise using 400 syllable passages do not differ significantly from ear to ear, falling generally within ten seconds of each other. Second, reading rates obtained from the dichotic application of delayed sidetone and masking noise for unilaterally deafened persons whose hearing is normal in one ear with deafness in the pathological ear of 30 db. or more, differ from ear to ear, the rate to the better ear being more prolonged and the difference exceeding ten seconds. Third, impeded reading rates do not differ significantly within the normally hearing group nor within the unilaterally deafened group before and after the dichotic application of delayed sidetone and masking noise, although there is a difference between groups. Fourth, in testing unilateral hearing losses, the more effective dichotic method involves the application of dst to the poorer ear first and to the better ear second. Fifth, no adaptation occurs during the reading of 800 syllables in the two-phase dichotic application of delayed sidetone and masking noise used in this experiment.

A New Approach to the Measurement of the Effects of Delayed Sidetone. **Linda M. McGranahan and G. Donald Causey, Veterans Administration, Washington.** — It was the purpose of this study to attempt to refine the measurement of the effects of delayed sidetone using binaural multiple delay. Measurement with the Purdue Speech Sound Timer was compared with the traditional stop watch method for consistency and sensitivity. Four levels of delayed sidetone (0, 20, 30, 40 db) were administered in alternating ascending and descending orders of presentation to thirty-six normal hearing subjects. The study was based on the hypothesis that a breakdown of overall time into high energy time and low energy time would yield the desired refinement. When using high energy time scores as the dependent variable, the Purdue Speech Sound Timer data showed a positive monotonic relationship between db level and performance time. Further analysis demonstrated that the Purdue Speech Sound Timer was not only significantly more sensitive to the effects of delayed sidetone, but also significantly more consistent in its response than was the stop watch. The same results were obtained when using both ascending and descending orders of presentation. On the basis of this study it is believed that delayed sidetone, when used with a speech timer or a similar timing device, can offer valuable assistance to the clinical audiologist. With the use of an instrument which is responsive to the variables of speech pattern and vocal intensity and one which is sensitive enough to measure effects produced by minimal levels of delayed sidetone, there evolves a significantly more consistent test. The delayed sidetone test then becomes of value as a threshold seeking device as well as an indicator of non-organic loss.

Delays Associated with Certain Sidetone Pathways. **Courtney Stromsta, Ohio State University.** — Past research has shown that, as hearing by bone-tissue remains unaltered, experimental delay and acceleration of air-conduction side-tone affects the performance of the speaker. If self-audition serves as a control factor in speech, then it is apparent that the aggregate effect of bone-tissue and air-conduction side-tone should be more thoroughly understood in terms of the two modes of transmission. On this basis, the delays inherent in (a) the shortest bone pathway from the superior medial incisors to the mastoid, and (b) the shortest bone-tissue pathway from the vocal cords to the mastoid were determined for frequencies ranging from 125 to 2,000 cps. In part, the results showed frequency dispersion (dependence of delay on frequency) to be more closely associated with the bone-tissue pathway than with the bone pathway. In addition, the obtained delays were compared to delays calculated for the transmission of air-conduction side-tone. (This work was supported by a Research Grant from the National Institutes of Health, Division of Neurological Diseases and Blindness).

F 13—THEORIES CONCERNING CORTICAL DYSFUNCTION

The Brain Stem Damage Syndrome. **Keith R. St. Onge, University of New Mexico.** — A case presentation with implications for differential diagnosis and theoretical considerations of brain stem injury.

Language Dysfunctions Associated with Right Brain Damage. **Jon Eisenson, Queens College.** — Twenty-five patients with right brain damage were examined with an inventory of tests. These tests were administered as part of a pilot-study of non-aphasic linguistic dysfunctions that might be associated with right brain damage. The results of the study suggest that there is impairment in ability to use language abstractly, especially when the language formulation is not initiated by the subject. Preliminary evaluation of the vocabulary responses of the pilot-study patients indicates a tendency for the subjects to be ego-oriented, and concrete in their definitions. Words tended to be defined according to use, and frequently according to very limited and specialized use. The evaluations suggest that right brain damage may be at least as frequently associated with impairment of abstract attitude and ability as Dr. Kurt Goldstein contends the situation to be for aphasic patients who have incurred damage to the left cerebral hemisphere. The approach tested in the pilot-study strongly suggests that though gross language and intellectual function is not apparently impaired to a serious degree by right brain damage, more subtle intellectual and linguistic functions show impairment.

Some Possible Relations Between Neurologic and Speech Findings With Aphasic Adults. **Ronald S. Tikofsky, University of Michigan.** — Since aphasia results from a lesion to the brain, it seems reasonable to assume that some relation should exist between neurologic findings and the results of speech examinations of aphasic adults. This assumption was examined by quantifying the results obtained from EEG and speech examinations made on 53 brain-damaged subjects in hospitals in Salt Lake City. The scores made by the subjects on items taken from various tests were factor analyzed. The method for quantifying the results obtained is presented. Five interpretable factors were derived from the statistical treatment of the data. The factors were given the following names: Factor A, General Abilities Factor; Factor B, Left Hemisphere EEG Factor; Factor C, Right Hemisphere EEG Localizing Factor; Factor D, Oral Response Factor; Factor K, Graphic Response Factor. The assumption presented above is not supported by these findings. However, this lack of support does not necessarily deny its possibility, but suggests rather, that the method of analysis employed was not the most appropriate. The implications of the results of this study are discussed in terms of the performance involved in Factors D and K and Schuell's hypothesis of "a single dimension of language deficit present in all aphasia."

Psychological Implications in the Adult With Aphasia. **Franklin C. Shontz, Highland View Hospital, Cleveland.** — Speech therapy is essentially a learning situation for the adult aphasic patient. It is often complicated by the patient's relatively advanced age, his emotional reactions to his disability, and his loss of intellectual efficiency due to brain damage. The speech therapy situation involves much more than simply inducing rote-learned responses from the patient. Consequently, the patient's progress must be evaluated in several ways. Intellectual changes, for example, may be characterized as alterations in height, breadth, or depth of intellectual accomplishment. Emotional changes must also be considered, as should changes in social adjustment. So far as possible, distinctions should be made between changes which could be accounted for on the basis of alteration in the patient's medical status alone, and changes which are probably due to treatment. More emphasis on objective before-and-after examination is required. Even standardized ratings are better than uncontrolled subjective evaluations. These suggestions are not designed as a chanllenge to the assumption that speech therapy benefits patients, but as an aid to arriving at a better understanding of speech therapy itself.

F 14—PSYCHOACOUSTICS II

A Comparison of Air Conduction Thresholds with the Use of Standard and Insert Earphones. **Harold Wanamaker and Alan S. Feldman, State University of New York, Upstate Medical Center, Syracuse.** — There now exists abundant clinical evidence that in cases of conductive hearing loss the air-bone gaps, as measured by conventional audiometric means, cannot exceed a limit of about 60 db. This limit appears of considerable scientific as well as clinical interest. It is particularly pertinent to the changes in sound transmission produced by otosclerosis. In order to find out whether the maximum air-bone gap of 60 db is determined by the anatomical factors or by the properties of the standard earphones, comparative measurements were conducted, using conventional and insert earphones. The experiments were limited to air conduction measurements on otosclerotic patients. If the results showed the same hearing loss for both earphones, it may be concluded that the maximum gap of 60 db was a property of the ear. If, on the contrary, the measurement with insert earphones led to

a greater hearing loss in patients with pronounced otosclerosis, it would be concluded that the 60 db limit is controlled by the air to bone ratio of standard earphones. Under such circumstances, the insert earphones would appear to provide a better evaluation of the state of the ear and facilitate the choice of surgical techniques.

Is Lack of Auditory Sensitivity Associated With Anything But A Peripheral Lesion? **Robert Goldstein, The Jewish Hospital of St. Louis.** — The thesis is defended that lack of auditory sensitivity is associated only with peripheral lesions and not with central nervous system lesions. Central nervous system lesions may interfere with the measurement of auditory thresholds but they do not reduce actual sensitivity. Difficulty of measurement should not be equated to reduced sensitivity. Thresholds reliably determined separately by behavioral responses and by electrophsiologic responses agree within the range of test re-test error, if the criteria for threshold are the same in each instance. This applies to unconditioned as well as to conditioned responses, and to behavioral as well as electrophysiologic responses. The thesis is supported by clinical and experimental evidence.

A New Method for the Measurement of Sensori-Neural Hearing Loss. **James Jerger, Tom Tillman and Robert Harrison, Northwestern University.** — The classical technique for the measurement of sensori-neural hearing loss, bone-conduction audiometry, has two serious disadvantages: first, the problem of adequate calibration of the bone-conduction system; second, the problem of when and how much masking to use on the ear not under test. The method herein presented is a modification of a technique originally proposed by Rainville, designed to circumvent these inherent difficulties by measuring the degree to which an air-conducted tone is masked by noise delivered directly to the cochlea under test via the bone-conduction pathway. Specifically, thermal noise of fixed intensity is presented to the skull through a standard bone-conduction oscillator mounted at the center of the forehead. The amount by which this noise shifts the pure-tone threshold via air conduction is compared with the shift produced by the same noise level in normal ears in order to determine the degree to which the sensori-neural hearing mechanism is impaired. The system is easily calibrated and completely eliminates the problem of cross-hearing to the non-test ear. Experimental results support its validity and reliability.

Measurements of Just Noticeable Difference in Intensity. **Herbert N. Jordan, Syracuse University.** — The determination of loudness recruitment by means of the just noticeable difference (jnd) in intensity has remained a controversial matter for a decade. The present study is an attempt to clarify some of the relevant issues, and more specifically, to test the validity and the reliability of the Lüscher-Zwislocki method. The jnd was determined by means of amplitude modulation as a function of sensation level and frequency on 26 subjects with normal hearing. The modulation was nearly a square wave with a fundamental frequency of 2.5 per second, and the psychophysical method of limits was used. The results show that, for pure tones, the jnd of intensity decreases with sensation level and is a minimum in the frequency range between 2000 and 4000 cps. They confirm the findings of Lüscher and Zwislocki and are in numerical agreement with Riesz's data, obtained by means of beats. This agreement suggests that the jnd does not depend critically on the modulation envelope and that the jnd measurements can be reproduced within narrow tolerances. The inter- and intra-subject variability were analyzed in order to be able to evaluate the reliability of individual jnd determinations.

An Experimental Measurement of Speech Reception Threshold For Affectively Toned Words. **William M. Shearer, Northern Illinois University.** — Although great strides in objective threshold audiometry have been taken in the past few years, the methods are still tedious and often painful to the patient. It was the purpose of this investigation to establish a test list of words which could be employed as an objective speech reception threshold test without the use of electric shock conditioning. The method used was to ascertain electrodermal responses of 25 subjects to a test list containing affectively toned, neutral, and spondee words. The words were all of two syllables and the test lists were balanced by matching for familiarity of words. Spondee words in the test lists were included in order to establish a standardized speech reception threshold for each subject. Affectively toned words were selected from lists which had been determined in previous studies to be most likely to elict significant electrodermal responses. Neutral words were selected on the basis of rankings by a group of judges. All thresholds were obtained with an ascending presentation. Affectively toned words having a significant average EDR deflection in comparison to neutral words were selected on the basis of analysis of variance. Rank order comparisons of the words were made with respect to EDR thresholds. Verbal thresholds, and relative familiarity. Correlative comparisons were made between speech reception thresholds obtained by verbal and those obtained by electrodermal responses. Twelve affectively toned words emerged from the study as being most likely to elicit significant EDRs under speech reception test conditions. The auditory thresholds obtained with EDR for these twelve words did not differ significantly from those obtained by verbal response to spondees. The resulting twelve words were: slimy, sex crime, belly, pregnant, cheating, spider, catholic, sexy, negro, husband, kotex, vomit.

F 15—CONTRIBUTED PAPERS: STUTTERING II

The Role of Covert and Overt Maternal Rejection and Acceptance in Stuttering. **Donald A. Kinstler, Los Angeles State College, Los Angeles.** — This study was formulated in an attempt (a) to create a usable scale which would differentiate between the attitudes of mothers of stutterers and mothers of children with normal speech, and (b) to test the hypothesis that the mothers of stutterers reveal a greater degree of covert rejection than the mothers of normal speakers.

A questionnaire was constructed to measure the accepting and rejecting attitudes of mothers toward their children. Sixteen judges classified the questionnaire items into categories of *overt rejection, covert rejection, overt acceptance,* and *covert acceptance.* The questionnaire was administered to thirty urban mothers of young male stutterers and to a matched group of mothers of children with normal speech.

The results revealed significant differences in the responses of the two groups. The following conclusions appeared to be warranted: (a) Mothers of male stutterers reject their children covertly more but overtly less than do the mothers of normal speakers. (b) Mothers of male stutterers accept their children less than do mothers of normal speakers. (c) Mothers of stutterers reject their children more than they accept them. Mothers of normal speakers accept their children more than they reject them. (d) Mothers of stutterers, when forced to choose between covert rejection and any other category, choose covert rejection more than do the mothers of normal speakers. (e) Mothers of stutterers, when forced to choose between overt rejection and acceptance, choose acceptance more than do the mothers of normal speakers.

One purpose of the study, the construction of a measuring device which would differentiate between the attitudes of mothers of male stutterers and the attitudes of mothers of normal speakers, was accomplished as far as this sample was concerned. The second purpose, the testing of the clinical hypothesis, was also accomplished, insofar as the scale devised did demonstrate that the mothers of stutterers reveal more covert rejection than the mothers of normal speakers.

Ingredients Common to Successful Treatments of Stuttering. **William H. Perkins, University of Southern California, Los Angeles.** — Many forms of treatment of stuttering have met with success. Of these only a few have worked well for a variety of qualified practitioners, the success of the others being more a function, apparently, of the clinician than of the technique. Are all of these approaches to treatment successful for different reasons or might they have basic features common to them all that could account for their results? The proposal here is that ingredients common to all successful treatments of stuttering can be delineated.

Stated generally, any therapy from which a stutterer gains a sufficient feeling of personal strength to assert himself comfortably as an individual will be successful. Success can be

measured by three interrelated criteria: (a) a sense of freedom in interpersonal relationships, (b) relief from concern about stuttering, and (c) reduction in the amount of blocking.

Specifically, any clinical relationship will be successful, regardless of technique or rationale, that provides the stutterer with a strong identification. The more the clinician is seen as being an omnipoent-like person the greater will be the success. The reduction in stuttering will continue at least as long as the identification is preserved.

Any therapy will be successful in which the stutterer accepts the challenge to express himself assertively and honestly. Techniques that may be utilized range from the pseudo-stuttering and speaking assignments of spech correction to the free association procedure of psychoanalysis. The amount of relief from blocking will be dependent on the extent to which the stutterer experiences a sense of personal freedom.

Any therapy will be successful during the period in which it makes the stutterer feel better able to express himself openly. Role playing, drug therapy, and inebriation could be utilized to this end.

Some Contributions of Psychoanalysis to the Treatment of Severe Stuttering. **Carl Ritzman, University of Oklahoma.** — This paper was one outcome of a project begun in 1950 for the purpose of investigating the value of speech therapy of psychoanalytic theory and techniques. A progress report was made in 1952 to the Central States Speech Association. Since that time the author has studied two years with the National Psychological Association for Psychoanalysis and has completed a training analysis which served also as a validation study.

In this paper a psychoanalytic account of the forces encountered in stutterers which oppose cure was supported and illustrated by excerpts from the case histories of a group of stutterers selected from those which have been treated by the author since 1952. After a demonstration of the types of resistances met in stutterers whose non-fluency is intermittent and whose blocks are the "compromise-formations" found in conversion-hysteria, a more intensive treatment was given to the presentation of a case of severe stuttering. Here non-fluency appeared not only as "compromise-formations" but also as "ritualistic" repetitions and as a labored kind of utterance seldom relieved by periods of normal fluency. In his case stuttering was shown to be a mixutre of hysteria and compulsions wherein the defense mechanism of "isolation" and "undoing" operated to render him very difficult to treat under any form of speech therapy but particularly in those which strive for personality changes. The nature of these mechanisms was explained and illustrations were offered of some ways to deal with them in the speech clinic.

Report on Play Therapy with Children, Four to Seven Years, With Severe Stuttering. **John S. Wortley, Phelps Memorial Hospital, New Tarrytown, New York.** — This paper described the particular "play therapy" approach that has been utilized with over 40 young children, ages four to seven, with severe stuttering symptoms. All of the children had marked "secondary symptoms" when initially examined and were consciously anxious about their communication problem and were experiencing significant environmental penalties.

The approach utilized was part of a total program of service often including the following team members—psychiatric social worker, clinical psychologist, consulting psychiatrist.

However the report focused on the following aspects of play therapy:

(a) Focal points in diagnostic evaluations that would indicate need for play therapy
(b) Personality patterns appearing as a result of psychological evaluations, social histories, etc.
(c) The setting of play therapy: materials
(d) Role of therapist in setting emotional climate
(e) Ingredients of the relationship between therapist and child
(f) The integration of "speech therapy" in this setting
(g) Several illustrative case examples presented with records depicting symptom change and descriptions of behavior modifications

Play therapy in a speech centered climate is but a medium through which a child is helped to come to terms with himself and the surrounding environment in which he must live and communicate.

The contents of this report were not the result of a carefully controlled study and are to be interpreted as further observational data that support the belief that play therapy seems to be a most effective method of initiating, maintaining, and consolidating the overall emotional re-education often necessary for the young child with communication problems.

F 18—PROBLEMS OF TRAINING AND LEARNING IN CHILDREN

Verbal Learning in Children with Normal and Reduced Auditory Acuity. **Wilton W. Murphy and John H. Gaeth, Wayne State University.** — In an effort to explore how children utilize vision and hearing in verbal learning, a simple verbal memorization task was presented to groups of children through vision, through audition, and through the two senses in combination. The paired-associates learning technique was utilized with a memory drum to present lists of 8 pairs of words visually, with a tape recorder to give them auditorily, and with the two pieces of apparatus synchronized to present them through both sensory modalities simultaneously. The subjects for the study were groups of normal-hearing children in grades 2, 3, 4, and 7 and groups of hard-of-hearing children in five hearing loss categories. The youngest children do best on the auditory presentations. Older children do about equally well under all conditions except where auditory learning follows visual practice. Hard-of-hearing children give equivalent performances on the visual and combined task but do much less well on all auditory presentations.

An Experimental Nursery Program for Children with Severe Language Retardation. **Kathryn B. Horton, Vanderbilt University School of Medicine and B. Jack Neas, George Peabody College.** — Over the past eighteen months, there has been carried on an experimental program designed for a group of childen exhibiting severely delayed language development. This program has been implemented by the premise that a cyclical relationship exists between the genesis or agenesis of language skills and the maturation of perception, intelligence, socialization and personality. This premise further implies that by the time a child's problem has become so apparent as to warrant the parents' seeking evaluation and treatment that one cannot hope to isolate a single area of maldevelopment which will define the basis for the child's failure to talk. Rather, one is compelled to study a child who has developed an infinite number of compensatory patterns of behavior, patterns which at that point in time have been reinforced to the extent that they could and would persist independent of the original causal factor. Therefore the habilitation of the child with delayed language necessitates serious consideration of and attention to all aspects of the child's behavior. This experimental program provides for an intermeshing of the diagnostic and therapeutic processes on a relatively longterm basis. The program is discussed in terms of the several goals and the methods utilized to achieve them: (1) periodic reassessment of physical, sensory, perceptual, intellectual, social and communicative maturation; (2) a dynamic program of therapeutic handling based on the results of the above reassessments; and (3) a program of group-oriented parent guidance to extend and expand the therapeutic program. Selected cases are presented to illustrate the concepts presented and the results of the program to date.

Diagnosis and Training of Children with Dysacusis: A Preliminary Report on an Experimental Program for Children with Communication Disorders. **Shulamith Kastein, Columbia Presbyterian Medical Center.** — This paper is based on research and clinical considerations leading to an experimental project for children with communication disorders, conducted jointly by Columbia Presbyterian Medical Center and Saint Joseph's

School for the Deaf, both in New York. The purpose of this study is to test the validity of the initial differential diagnosis and the usefulness of diagnostic terms with regard to interdisciplinary understanding and educational planning. Five major groups of disorders of communication are being considered and the children are grouped in small classes according to predominant impairment of language and speech due to: (1) peripheral hearing loss, (2) central auditory imperception (receptive aphasia; word deafness), (3) central expressive dysfunctions (expressive aphasia; anmia; apraxia), (4) behavior, perceptual and learning difficulties as part of a "brain-injury syndrome", (5) emotional disturbance. Other aspects of the projects are educational therapy for these children and teacher training. The educational therapy is based on the preliminary differential diagnosis and on the child's personality, intelligence and age. Sensory training is used to establish more adequate perceptual functioning by carefully graded concrete experience to train appropriate awareness of and response to auditory, visual and kinesthetic stimuli and memory. Concept formation and language are taught simultaneously and abstract thought processes are trained on this basis. Self concept is developed through creative expressions of the child and development of his feelings about himself and his world. Meaningful communication, no matter how simple, is stressed in academic training, applying comprehension and use of written and spoken symbols. Training of tolerance for frustration from internal and external stimuli in a structured environment is part of the program. Parts of a film in color, of the initial language and hearing evaluations, observation of the children in the classroom and re-evaluations at the Speech and Hearing Clinic will be used to illustrate the presentation.

Evaluation of Oral Communicative Skills in Two Groups of Children with Peripheral and Non-Peripheral Types of Auditory Dysfunction. **Freeman McConnell, Vanderbilt University School of Medicine.** — The effect of auditory dysfunction on the development of oral language has not been well defined for children discovered to have reasonably normal end-organ hearing, but who show poor response to sound similar to peripherally deaf children. Through a research grant from the National Institute of Neurological Diseases and Blindness, two groups of children are being studied on a continuing basis as they undergo intensive daily training in a nursery and preschool program of the type presented to young deaf children for whom oral speech and language is an important goal. The study includes both those with normal peripheral acuity as determined by GSR audiometry, and those whose hearing responses are similarly depressed by both objective and subjective audiometric measurement. The purpose of the study is: (1) to evaluate the rate of progress in development of oral language skills as shown by the non-peripherally deaf and by the peripherally deaf, and (2) through such evaluation to determine the suitability of such programs for non-peripherally deaf preschool children. To measure each child's speech and language in the beginning and periodically as he progresses in the program, three rating scales have been devised. These three scales deal with the three avenues of communication which the hearing impaired child utilizes in his compensatory development of oral language: speechreading, hearing, and speech. The first two scales place emphasis upon the reception of acoustic stimuli, including the spoken language, while the third deals only with the oral expressive ability of the child. Evaluation of preliminary findings, based on six consecutive quarterly observations and after sixteen months of training, has revealed certain interesting trends. The deaf children appear to develop oral communicative skills at an earlier age, but the non-peripherally deaf group become more like the deaf group as the length of training time increases, or with maturation in age. Comprehension of speech through vision and hearing combined precedes expressive speech ability for both types of children. When achievement in visual-auditory comprehension of speech for the first observation period was compared to that noted in the last observation period, all the peripherally involved children and approximately three-fourths of the centrally involved group showed improvement. While these trends will need further accumulation of data to be substantiated, tentative evaluation of the results of intensive acoustic stimulation training for children with central-pathway involvement is favorable.

2

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S 1—LANGUAGE DISORDERS: AN EDUCATIONAL PROBLEM

Diagnostic Procedures on Children Referred for Language Disorders. **Katrina de Hirsch, Columbia Presbyterian Medical Center.** — This presentation discusses diagnostic procedures and draws some theoretical conclusions. The examiner's theoretical position largely determines his diagnostic approach. Language is both a bridge to other human beings and a highly specific tool. In evaluating any language disturbance both specific and emotional aspects must be taken into consideration—not only their relative significance but also the interaction between them. Language is a continuum and embraces all forms of verbal communication. Consequently, our diagnostic approach is the same for all language disorders, though in each case emphasis may be slightly different. Language in all its aspects is a highly complex form of behavior. In diagnosing language disturbances, we have to evaluate carefully not only the child's sensory endowment, but also neuro-physiological and other underlying phenomena. The child's overall motility, his body image, his motor and neuro-motor patterning, his competence in dealing with auditory, spatial and figure-ground organizations are all highly pertinent to language performance. Investigations carried out over the last 16 years at the Pediatric Language Disorder Clinic, Columbia Presbyterian Medical Center show that large numbers of children referred because of language disorders are physiologically immature in one or several of the areas mentioned above. Noting the presence or absence of such immaturity helps in evaluating the relative importance of emotional and specific language factors in the presenting symptom and thus facilitates decisions as to therapeutic procedures.

Diagnostic Findings on School Children With Language Disorders. **Nancy E. Wood, Cleveland Hearing and Speech Center.** — One educational enigma which currently confronts parents and teachers is that some children who are known to have average or above average intelligence are unable to learn educational basics such as reading, writing and arithmetic. Although these educational limitations are more clearly recognized when a child is older, there are often early indications that a potential educational problem exists. Delayed speech and language development can be one symptom. Reading, writing, arithmetic and speech have one major factor in common. All four processes depend upon the reception and expression of symbols. Therefore, if a child has a severe problem performing tasks that require the comprehension and expression of symbols, but is able to perform adequately on tests that are nonsymbolic in structure, it is possible that his learning problem is caused by a language disorder. For this reason, children with learning disorders often become the partial responsibility of the speech and language pathologist. This report concerns information obtained from a study of 100 children referred for language evaluation because of learning problems. All S's were between the ages of six and nine years and were attending normal school at the time they were seen for evaluation. The IQ range for this group was 86-111. A number of factors which emerged from this study are discussed, but the primary point, which is threaded throughout the findings, stresses the need for schol programs which will provide adequate and necessary opportunities for the education of children with language disorders.

An Educational Approach to Children With Language Disorders. **Miriam T. Tannhauser, Montgomery County (Md.) Public Schools.** — After five years of experimenting with classes for children with known neurological disorders, satisfactory classroom grouping procedures and instructional techniques had been worked out. Other procedures and techniques, applied to groups of "emotionally disturbed, under-achieving, hyperactive children," were not satisfactory. It was observed that both groups were strikingly similar in response to learning situations and in behavior; the emotionally disturbed children acted as though they were brain-injured, even though diagnostic data had ruled out the existence of organic pathology. Experimentally, therefore, a few emotionally disturbed children were placed in a brain-injured group and were found to grow in achievement and emotional control. A scientifically controlled study was thereupon made in a public school setting. Teachers worked with children in classroom situations which called forth healthy motivational drives toward learning and maturity. In this frame of reference, disturbed behavior was looked upon as a symptom of, or associated with, learning difficulties and not necessarily a symptom of emotional problems. The long-range goal was to remove the difficulties which result in the unhappy, disorganized behavior of children. It was essential first to discover what the learning problems were. Diagnostic data were assembled by the staff, and a teaching methodology was developed. On the basis of these data, the children were grouped in order to evaluate the usefulness of the specialized methodology. The needs and problems of the children, and the ways in which they were met are discussed.

The Neurologically Damaged Child Functioning in the Public School. **Marie E. Brittin, Tacoma (Wash.) Public Schools.** — The major problems in helping the neurologically damaged child in the public schools seem to be: (1) discovery, (2) evaluation, (3) educational placement, i.e., regular classroom or special placement according to need for service and the practicable location of personnel and equipment, and (4) trained staff to provide for their needs. We know that present diagnostic procedures indicate an ever increasing number of these children presenting neurological deficiencies. A program can be instigated when there are concerned, understanding administrators and parents who recognize the need and are dedicated to providing such educational services. A child may enter school for observation and testing in the educational environment. Initial testing, medical diagnosis, and case history should distinguish the neurologically damaged from those whose primary impairment is hearing, vision or intellectual deficiency. The extent of motor involvement and sensory loss should be delimited. A child's attendance may be for an hour or a half day, then gradually lengthened depending on adjustment to the educational situation. Socialization with a few speaking children, the structured use of topys, sensory-motor training, symbol-speech-activity lessons, auditory training, and speech reading may be provided. As the child develops self-control, a lengthening attention span, and evidences the emergence of propositional speech, he is developing the ability to profit from more complex learning experiences. The older school child who is continuing to attempt to work through the limitations of neurological damage in the regular classroom may also need special learning techniques. A structured situation and planned educational experiences should be provided for the neurologically damaged. No child should be tested and then simply "dumped" in a classroom with an over-worked teacher and forgotten. Evaluation and re-evaluation, planning and re-planning determine the effectiveness of any educational effort for the child as well as economy for the school system.

S 2—PSYCHOLOGICAL ASPECTS OF SPEECH PROBLEMS

Home Background Influences on the Development of Speech Skills in Older Children. **Michael Marge, Harvard University.** — The purpose of this investigation was to study the home background influences on the development of oral communication skills in preadolescent children. A sample of 143 parents and children, representing a normal population with regard to intelligence and socio-economic status, were the subjects of the

study. In order to obtain the most valid and reliable criterion measures of speaking ability in children, a methodology new to the field of speech, factor scores, was employed. Before these scores were computed, a factor analysis was done of 40 variables covering the whole dimension of oral speech behavior. Seven factors or elements were extracted from the analysis: General speaking ability as assessed by speech therapists, Motor skill in speech, Speech dominance, Non-distracting speech behavior, Voice quality, Language maturity, and General speaking ability as assessed by classroom teachers. Three general areas of home background influences—(a) permissiveness of parent, (b) parental demands, and (c) techniques employed in the home to implement the demands—were studied in their relation to the criterion measures of oral communication skills. The results indicated the following trends:

1. More permissive parents tend to have children with higher scores in general speaking ability.
2. Parents who demand achievement in the development of better oral expression are found to have children who achieve higher levels of speech skills.
3. The more techniques of speech training employed in a home, especially during the earlier years, the greater the tendency for the children to achieve higher scores in general speaking ability.

Psychological Implications in Speech Therapy: A Consideration of Infantile Thinking Characteristics and the Body Image Concept. **Ruth M. Clark, University of Denver.** — Two aspects of the psychological adjustment of the handicapped that have not received as much attention as they warrant were discussed. These areas are:

I. *Infantile Thinking:* the development of thinking from infantile characteristics to the adult process.

Infantile thinking is pre-logic thinking, and the following characteristics were discussed and related to a case history from a Psychology text:

(a) Ambivalence, (b) Autistic thinking (fantasy — day dreaming), (c) Animism, (d) Omnipotence, (e) Egocentric thinking, and (f) Eidetic imagery.

II. *Body Image:* body image and the implications of this concept for the speech handicapped.

Body image is important because a person's conception of his own body has a great deal to do with a person's conception of his own personality and of his relations with other people. In the early development of our body image, emphasis upon one particular part of the body by disease or by the attention of others creates an increased psychological value to the part which disturbs the proper relationships and development of the body image.

This body image has an important effect on how people feel and should be considered in understanding the psychology of the speech handicapped individual. An individual's body image may be an exaggeration of a condition or a refusal to accept actualities.

The paper concluded with mention of areas in this field that need further attention.

Psychological Aspects of Speech Training. **Edward Penson, Director, Speech Science Laboratory, Ohio University.** — The purpose of this study was to determine whether or not words which had been stuttered in an oral reading situation were more difficult for the stutterer to perceive or recognize than non-stuttered words from the same oral reading situation. The procedure of the study involved tachistoscopic viewing of neutral and stuttered words by 20 stutterers.

The results, in brief, indicate that group means for recognition time on stuttered words point to a longer average recognition time for the stuttered words as opposed to non-stuttered words. These findings seem to support some of the current thinking of clinical and learning psychologists regarding "perceptual defense" and are also significantly in harmony with recent findings in the multi-channel listening studies which explore the behavior of human filters in the perceptive mechanism —visual as well as auditory.

Attitudes of Parents of Speech Defective Children. **John H. Wiley, Director, Speech and Hearing Laboratories, University of Nebraska.** — The author has been studying parental attitudes for several years and has previously reported at conventions and in the Journal. This study is a continuation of studies of parental attitudes and their relationship to children's behavior. The author's attitude scale was administered to several groups of parents of children with speech defects. Some groups of children were enrolled in the University of Nebraska clinic, while others were enrolled in public school therapy programs.

Comparisons were made between types of speech defects and between University and public school groups. Other comparisons were made to groups evaluated in previous studies. Implications of these findings for clinicians were discussed.

A Study of the Values of Utilizing Psychotherapy in a Public School Speech Correction Program. **Yvonne M. Lofthouse, Division of Education at Mercy College, Detroit.** — During the period from September 1950 to December 1952 a study was made of the values of utilizing psychotherapy in an elementary school speech correction program. The subjects were 62 children enrolled in speech correction classes in four schools in the Windsor, Ontario, system. Ages ranged from five to 14 years.

The length of therapy varied from three months to three years, depending on need and when the child entered the program. The depth of therapy varied from a program of regular treatment within a permissive atmosphere to the exclusive use of psychotherapy without any attempt to modify the speech itself.

The paper presented a brief review of the literature pertaining to the subject, a summary of some of the procedures and materials usually involved in psychotherapy, and a description of how psychotherapy was utilized in this particular experiment. Data gathered from a follow-up study made six years later were also presented.

S 3—VOICE PROBLEMS

Contact Ulcer and Voice Production. **Hans von Leden, Gould Research Laboratory and Northwestern University Medical School, Chicago.** — Contact ulcer is reported in the literature as being caused by abusive use of the larynx. The specific, detrimental behavior producing the lesion is considered to be the striking of the vocal processes of the arytenoid cartilages against each other during adduction. A "hammer and anvil" analogy is often used to illustrate the action visualized. The vigorous, traumatic contact between the arytenoids is generally associated with low pitched, guttural voice production.

A motion picture study of the initiation and development of a contact ulcer confirms the etiologic concept of the pounding of arytenoids against each other. However, the pictures also reveal potentially abusive rocking and grinding motions of the arytenoids during certain types of phonation that may be as significant etiologically as the smashing approximation of these cartilages. The clinical manifestations of a contact ulcer and the evidence to support the theoretical aspects of the discussion were presented by motion picture.

Electromyographic Investigation of the Function of the Internal and External Intercostal Muscles During Phonation. **Michael S. Hoshiko, Southern Illinois University.** — Survey of the literature indicates that the intercostal muscle function has been the object of study and controversy since the time of Galen. Electromyographic investigations made by Stetson and his colleagues over twenty-five years ago virtually consist of the

only studies in this area. The purpose of this study was to investigate electromyographically the intercostal muscles during phonation following the methodology and theoretical framework of Stetson and to test some of his hypotheses. Stetson's theoretical work is based upon the concept that the syllables are produced by ballistic movements consisting of two antagonistic muscles. His basic assumption is therefore that the internal intercostal muscles are expiratory and therefore were responsible for the initiation of the syllable pulses while the external intercostal muscles are inspiratory and therefore were instrumental in the arrest of the syllable pulses. The present investigation failed to indicate that the function of the intercastal muscles during phonation for speech purposes follows the same antagonistic pattern reported for vegetative breathing. Action potential was not secured from the external intercostal muscles at the termination of phonation to indicate the arresting function. Phonation on inhalation produced the same action potential pattern from the internal intercostal muscles as was secured during phonation on exhalation. The concept that the ballistic movements release the syllable pulses and are then arrested by the external intercostal muscles was not supported by the present findings. It is suggested that the two intercostal muscles work together to release the syllable pulses and that the arresting action occurs at the level of the larynx by the quick impounding of air by the glottis in the absence of an arresting consonant.

Young Children With Vocal Nodules: Diagnosis and Therapy. **D. Kenneth Wilson, Child Guidance and Speech Correction Clinic, Jacksonville, Florida.** — Plans for young children with vocal nodules are dependent upon adequate diagnostic measures. This paper described essential diagnostic procedures and therapy for children with vocal nodules. Adequate diagnosis should involve the following personnel and procedures: The pediatrician must examine the child for over-all condition and the laryngologist must administer a laryngeal examination. The speech therapist, and in some instances a social worker, then interviews the parents to get background information, to determine the emotional needs of the child, and to ascertain parent-child relations. Next a psychological and/or neurological evaluation may be in order. The psychologist can determine intelligence and personality structure of the child and the neurologist can determine any contributing factors. Now the speech therapist is ready to administer various speech and hearing tests. The last step in the diagnostic procedure is a staffing of the child by the examining staff in order to plan the remedial program. The therapy plan may include counseling for the parents, psychological therapy for the child and/or voice therapy for the child. Voice therapy includes: (a) ear training in the recognition of pitch levels, loudness levels, and quality aspects of voice, (b) production and control by the child of various pitch levels, loudness levels, and quality aspects, and (c) a careful carry-over plan from the regular clinic situation to the outside, including reports from teachers and parents. Proper use of voice in play and how to avoid vocal abuse are emphasized. A complete diagnostic procedure is necessary for children with voice problems due to vocal nodules. Therapy may involve several disciplines, including speech.

The Use of the Thyro-Hyoid Groove in Voice Therapy for Functional Disorders of Pitch. **Robert L. McCroskey, Emory University.** — The purpose of this paper was to describe a therapeutic technique employed to alter an inappropriate habitual pitch level. A complete case history was presented from the first interview through to dismissal from the clinic. Phases of voice therapy were discussed and illustrated: (a) psychological and physical exploration, (b) report of laryngeal examination, (c) breaking the pitch barrier, (d) establishing ease of production of the new voice, (e) alteration of the accustomed side-tone, (f) controlled practice and mental preparation for every-day use of the new voice, (g) routine use if new pitch level, and (h) the subject's autobiography of reactions to therapy at its various stages.

A Study of Spastic Dysphonia: Neurologic and Electroencephalographic Abnormalities. **Evelyn Y. Robe, Joel Brumlik, and Paul Moore, Northwestern University Medical School, Chicago.** — A study of ten patients with spastic dysphonia revealed neurologic abnormalities in all cases and electroencephalographic disturbances in 9 of the subjects. Both the neurologic and EEG findings point to a cortical disturbance of paroxysmal nature in the right cerebral hemisphere in the temporo- parietal junction. This suggests that spastic dysphonia is a symptom of a neurologic disorder, possibly specific in location, but most likely varied in etiology.

S 4—EVALUATION OF HEARING AIDS

The Evaluation of Hearing Aids. **Raymond Carhart, Northwestern University.** — Critics of hearing aid evaluation have argued, first, that selection of the best instrument is an impossibly complicated task and, second, that speech audiometry is sufficiently inaccurate so that earror of measurement obscures distinctions among instruments tested. Both arguments are directed toward an archaic philosophy of "hearing aid fitting" which does not represent the modern concept of the evaluative procedure. According to this concept, the goal is to assess each individual's prospects as a user of wearable amplification and to recommend the desirable course of action in the light of the clinical analysis of the problem at hand. Part of the information essential in such an assessment can currently be obtained only through testing the individual's efficiency while he is wearing commercial hearing aids. For one thing, clinical experience demonstrates that many users are adversely susceptible to the limitations in electro-acoustic performance which characterize contemporary wearable aids. Some users are also adversely susceptible to dissimilarities among instruments which, though not yet precisely identifiable, result from two factors. First, commercial hearing aids differ in transient response and in related subtlties of sound reproduction which are not reported by the engineer to the clinician. Second, a wearable hearing aid and its user become a functioning unit wherein physical behavior of the aid is affected by such details as body-baffle effect and fit of the earpiece. Therefore, decision regarding efficiency with wearable instruments cannot be based exclusively on measurement of the patient's unaided auditory abilities. Moreover, four major clinical judgments are facilitated by evaluation of a person's performance while he is wearing hearing aids. The first is choice between body-worn and ear-level type of fitting. The second is decision as to whether a binaural aid offers sufficient extra help to warrant its recommendation. The third is determination of the limitations and the efficiencies which the used may expect in everyday listening situations with a wearable aid that suits him well. The last is recommendation of one or more commercial instruments, which have been demonstrated to be satisfactory in the light of these limitations and efficiencies. The information obtained by evaluating a person's performance with wearable instruments allows more definitive analysis of his problem, more effective advisement as to his educational and rehabilitative needs, and more positive guidance in procurement of an instrument which is suitable for him. As such, the evaluation of hearing aids is an important facet of total audiological management of a case.

S 5—STUTTERING: CASE PRESENTATIONS

Treatment of an Adult Stutterer in Terms of General Semantics. **Dean E. Williams, State University of Iowa.** — A summary of therapy, tentative results and future recommendations was presented for a 25-year old female who stutters. This girl participated in an 8-week therapy period during the summer of 1959. Detailed records were kept and frequent tape recordings made of the individual conferences with the special purpose of presenting a summary of them to this convention.

An important aspect of the therapeutic process involved a systematic discussion and demonstration of the relationship of

one's language behavior to other kinds of behavior such as "stuttering." Emphasized throughout was the point of view that modifications in one aspect of behavior interrelate and hence necessitate changes in other aspects of behavior. In order to define and to describe behavioral changes to be attempted, the case was encouraged to use language that was descriptive instead of explanatory or animistic. As questions were defined and the variables described, possible solutions were tested operationally by direct experience in various interpersonal relationships.

Role Change in the Psychotherapy of an Adult Stutterer. **Joseph G. Sheehan, University of California, Los Angeles.** — The case of a 22-year old stutterer with associated emotional problems was presented to illustrate steps in the development of a therapeutic relationship. The patient, who called himself Cyrano because he had a "face that only a mother could love," expressed his feelings throughout the therapy with a series of drawings illustrating the therapeutic relationship and his life situation as he felt it to be at that time. From an early emphasis on speech therapy in which the individual felt a great deal of threat there is the building of a psychotherapeutic relationship which permitted the patient to work out a number of roles he felt and to "find himself." Implications of the case for the relationship of psychotherapy and speech therapy and the treatment of the adult stutterer were presented.

S 7—BONE CONDUCTION

Clinical Enigmas. **Donald M. Markle, New York University. — Bellevue Medical Center.** — A presentation and discussion of cases that appear to violate principles which are generally accepted by practitioners in the field of clinical audiology: reversible "nerve" deafness; immeasurable bone conduction lateralization to a dead labyrinth.

Clinical Measurements. **Charles Lightfoot, University of Illinois.** — Three little-used procedures have been tried by the author in an effort to obviate masking the ear contralateral to that for which bone-conduction threshold is sought: 1) determination of the level of BC noise required to mask a threshold-level AC tone, as suggested by Rainville; 2) solicitation of response to intra-aural beats induced by simultaneously presented AC and BC tones of slightly different frequencies, as suggested by Suzucki and Ichihawa; 3) probe-tube measurement of SPL in the external canal when the skull is vibrated as suggested by Anderson, Holmgren and Holst. Details of each procedure, along with its complications and advantages, are discussed.

Physical Standards for Bone Conduction Measurements. **Richard K. Cook, National Bureau of Standards, Washington.** — Measurements of uditory threshold by bone conduction are most conveniently made by means of an audiometer and the vibrator used with it. It is important that audiometers produce the same known amounts of vibration at different places and times. To assure this, the vibrator must be calibrated so as to produce the required known vibrational force. This is best done with the help of an "artificial head bone." The latter must have the same acoustical characteristics as the bones of the head. The results of some acoustical measurements on the head will be presented, including the threshold of hearing by bone conduction. It is anticipated that these data can serve as a basis for national and international standards for the measurement of hearing.

The Masking of Bone Conducted Pure Tones by "White" and Narrow Band Random Noise. **Gerald Studebaker, Syracuse University.** — In bone conduction audiometry the functional separation of the two ears often poses a difficult problem. Whenever the ear with a greater loss of hearing by bone conduction is tested, the contralateral ear must be masked. The masking noise must have an intensity that makes the test tone inaudible in the ear not under test, but does not affect the threshold of audibility in the tested ear. The first criterion determines the minimum required intensity, the second, the maximum permissible intensity. The greater the range between the two extremes, the greater the proportion of patients that can be tested reliably. The minimum and maximum noise intensities were determined for white noise and narrow band noise at five frequencies of the test tone. A standard earphone and a semi-insert earphone were used. The results indicate that the narrow band noise permits a more accurate determination of the two limiting intensities than the white noise, and that the semi-insert earphone produces a greater range between the minimum and the maximum intensities than standard supra-aural earphone.

On the Measurement of Bone Conduction. **Jozef Zwislocki, Syracuse University.** — Probably no other aspect of clinical audiometry has been more misinterpreted than bone conduction testing. An attempt is made to clarify some of the issues that have survived for many years, and to give some suggestions oriented toward a simplification and standardization of clinical bone conduction testing. In particular, the discussion includes the effects of middle ear pathology, the optimum placement of the vibrator on the head, and the problem of masking.

S 8—VARIOUS AUDIOLOGIC PROBLEMS

An Investigation of Secondary Nerve Degeneration in Clinical Otosclerosis. **Alan S. Feldman, State University of New York, Upstate Medical Center, Syracuse.** — There is quite general agreement that the hearing loss in clinical otosclerosis begins as the result of stapedial fixation and is consequently expressed by the audiogram as an impairment of hearing by air conduction. Agreement is not as common when considering the potential involvement of cochlear function. Secondary nerve degeneration is the term most commonly applied to clinical findings of nerve involvement which may be observed in the later stages of clinical otosclerosis. The present paper is a report of an investigation of the amount of nerve degeneration found in unoperated otosclerotic ears after the existence of hearing loss for varying durations. In this study, subjects were grouped according to duration of hearing loss and the amount of existing nerve involvement was evaluated both regarding and disregarding the age factor. The results would suggest that secondary nerve degeneration, if at all a concomitant of otosclerosis, is independent of duration.

Problems in Recording and Analyzing Stapes Mobilization Data. **Eddie W. Johnson, University of Southern California School of Medicine and Richard L. Hughes, Los Angeles.**

A. The Mechanics of Stapes Mobilization data recording based on record keeping of more than 3,000 cases.
   1. *What is recorded?* A description of the 34 categories and the 177 items of data punched on the card.
   2. *How is it recorded?* The card designed for the purpose is shown. The equipment necessary for recording, sorting and filing is explained.
   3. *When and where is data recorded?* The time of recording and the personnel and place involved in recording at each step is discussed.
   4. *Why record data?* The two basic reasons for recording are:
      (a) To consider results with a view toward improvement or change of surgical techniques.
      (b) Preparation of educational and instructional centers.

B. Problems in recording and analysis of data.
   1. Mechanical problems. Accuracy of all personnel and handling cards extremely important.
   2. Keeping up with changing surgical techniques.
   3. How to analyze results. What is surgical success. Can results be best expressed in:
      (a) Closure of air-bone gap?
      (b) Achievement of 30-db post-operative level?
      (c) Combination of above items?

4. What is the roll of speech tests for pre- and post-operative cases?

5. How do we best treat revisions of previously unsuccessful surgery?

Hearing Aids and Unilateral Conductive Deafness. **Irwin Malles and Donald W. Markle, New York University—Bellevue Medical Center.** — Although there has been a tendency to underestimate the degree of handicap resulting from unilateral deafness, recent studies of the additional benefits obtained while wearing a binaural hearing aid has provided reason to speculate that unilateral deafness is more handicapping than commonly believed. Wearers of conventional monaural hearing aids often complain of having difficulty listening when in a noisy environment; patients with unilateral hearing losses express the same complaint. On the basis of these observations, it was decided to investigate the auditory function of a group of patients with unilateral conductive deafness. In the presence of competing background noise which was separated in space from the test signal, auditory discrimination was determined at signal/noise ratios of 0 and -10 db; testing was done both with and without a hearing aid. A significant improvement in auditory function was obtained when a hearing aid was worn in the affected ear.

Phonetic Analysis of Responses of Acoustically Handicapped Subjects to PB Words. **Herbert J. Oyer and Mark Doudna, Ohio State University.** — Recorded PB word tests employed in the measurement of auditory discrimination are usually presented at a sufficient intensity level to minimize the possible effect of purely non-neural aspects of a hearing loss. Test results are scored on the basis of the percentage of test words correctly repeated. Previous and continuing analysis of erroneous responses for PB words presented to those with auditory deficiency has revealed certain patterns of word omission, substitution, and phonemic confusion which suggest further study. Some words are responsible for more errors than others. Study of substitution errors indicates that while a range of words may be substituted for each test item, there is a similarity between phonemes in the correct word and the phonemes of the word or words substituted for it. Certain phonemes tend to occur more frequently than others in the total distribution of words substituted. Moreover, there is a relationship between the relative familiarity of the substituted word and that of the word for which it is substituted. In the present study an attempt has been made to analyze test results for 400 pathological ears to establish a matrix of phonemic confusion patterns most often encountered. Findings indicate trends and correlations for preservation and correction of error, phonemic confusion, and structure of the test word or response to it. Results are presently being employed in clinical examination and therapy as well as serving as a basis for further research in the field of auditory discrimination.

Audiologic Testing in a Vertigo Clinic. **Philip E. Rosenberg, Temple University School of Medicine.** — For the past two years, the Department of Otorhinology of Temple University Medical Center has conducted a detailed study of vertigo in its "Vertigo Clinic." This clinic was designed to evaluate the efficacy of the classic tests for diagnosing the etiology of vertigo. In addition to minimal and mass caloric stimulation, turning tests, and other tests of labyrinthine function, a standard battery of audiologic tests were administered to each patient. Evaluation of the various techniques, in terms of their total diagnostic ability is now being made. It has become apparent that the final diagnosis of the vertiginous patient is aided greatly by the audiologic examination. Several distinct groupings have become evident in terms of vestibular pathology. First, those cases finally diagnosed as Meniere's disease, yield highly specific audiometric test findings. Second, another reasonably large group where the eventual diagnosis is that of specific physiologic pathology also show definitive audiometric test results. Third, a very large group in whom no physiologic pathology was found and in whom the psychiatric evaluation proved positive in terms of a functional disorder, showed predominantly normal hearing test findings. More than any other single examination, audiometry, even as a screening device, yields information which correlates very highly with the final medical-otological diagnosis. The members of the study team have come to rely more heavily on the results of the hearing tests in making a final diagnosis than on any other single evaluative technique.

S 9—IMPLICATIONS FOR THERAPY AND TREATMENT OF CHILDREN WITH LANGUAGE DISORDERS

Aphasia, or Hearing Loss? **Edna Monsees, Children's Hospital, Washington.** — In making a differential diagnosis of aphasia in a child who has failed to develop speech at a normal age, the clinical team must first eliminate other possible etiological factors. In actual practice, the child most commonly seen is the one with multiple handicaps – the aphasic child who is also mentally deficient, emotionally disturbed, or auditorily handicapped. The problem of differentiating sensory aphasia and deafness is particularly difficult. In our school for children with aphasoid language disability, 21 of the 25 children currently enrolled have the common characteristic of being unable to understand spoken language.

Many show normal thresholds as measured by EDR audiometry. By standard audiometry, many of these children are unable to give consistent and reliable responses; the others show various degrees of hearing impairment ranging from mild to severe. In most of the latter, the thresholds are not consistent with clinical and family observations of the child's responses to environmental sounds. Previous to enrollment in our school, 19 of the children had been trained as hard of hearing for periods ranging from six months to five years. All had failed to make acceptable progress with this training. When the teaching method was changed to the all-sensory-motor approach developed by McGinnis at the Central Institute for the Deaf, all the children began to achieve. The child's response to the teaching method used is frequently the crucial factor in the differential diagnosis of sensory aphasia.

Implications for Therapy to be Found in the Test Results of the Houston Test for Language Development. **Margaret Crabtree, Houston (Tex.) Public Schools.** — This paper discusses methods of language therapy that are indicated by the test patterns of "The Houston Test for Language Development." Two cases that have been given the test are discussed. Slides are shown of the test profile of each case. Case 1 was an eight year old boy with mild cerebral palsy. He was enrolled in the public school for the third year in an othopedic class on the readiness level. He had an I. Q. score of 98 on a performance test. His language age, based on "The Houston Test for Language Development," was 22 months. The range of language items missed was from two to thirty-six months, or to the upper limits of the test. The types of items missed included those related to social competency and expressive abilities. The items related to comprehension were passed. The expressive problem could not be accounted for on the basis of muscular involvement, but appeared to be related to an auditory dysfunction. Specific methods for developing social and symbolic behavior are discussed. Case 2 was a three year old boy. He was described by a pediatrician as having behavioral patterns that characterize the brain-injured child although the neurological study was negative. According to scores on "The Houston Test for Language Development," he had a language age of 11 months. The lowest score was in vocalization and the highest was in gesture. Therapy centered around listening activities, vocal stimulation, vocabulary building and increasing the attention span. He was retested at the age of four at which time he showed a language age of 27 months. The two cases are compared from the standpoint of test patterns and therapy.

Speech and Language Development of the Retarded Child. **Marie Orr Shere, University of Illinois.** — The purpose of this paper is to discuss the philosophy of speech and language training for the retarded child and to present certain practical applications of this philosophy. The term "retarded" refers to those children whose speech and language is not appropriate to their chronological age. The etiology of the retardation in-

cludes mental, physical, psychological or environmental factors which could affect communication. The ability to communicate is an essential part of the entire educational program for the retarded child; hence all training in speech and language development is directed toward helping him acquire this ability to the fullest extent of his potentialities. The procedures used in this special training in the development of the speech and language of any retarded child are essentially the same: to present experiences accompanied by appropriate speech; to encourage the child to make a vocal response of any description; to refine this gross response by means of auditory, visual and kinesthetic stimuli into an imitation of the sound; to require the child to make this appropriate sound when the experience is presented or desired; to help the child to use word combinations by speaking to him in phrases and short sentences. The concepts presented should be functional; the experiences real. At first objects are preferred. Later books and pictures are used with success. Experiences in home, school and neighborhood which the "normal" child encounters without any special direction must be purposefully presented to the retarded child. Every experience should increase the child's desire to communicate. Therapeutic materials, designed to provide experiences in all areas of learning have proved successful in developing language and speech within the bounds of the child's potentialities.

A Comparison of Deaf and Aphasic Children on a Test of Inner Language. **Eileen F. Silber, The Bill Wilkerson Hearing and Speech Center.** — A non-verbal picture test of inner language was devised and administered to two groups of children, one group composed of 25 children diagnosed and accepted educationally as aphasic, and the other of 17 children classified as deaf. The age range was 6 to 10 years with a mean age of seven years nine months. The test was constructed in three parts. Part I dealt with pictures of objects or events; Part II with actions or verbs; and Part III with objects or actions considered over time, and to be arranged in correct sequential order. Responses of each diagnostic group were compared for each item choice by means of the chi-square test to determine whether or not the total responses were significantly different. The items of Parts I and II showed a wide range of differentiating ability with apparently no characteristic common to either the successful or non-successful items. Age did not appear to influence the responses of the deaf group when the responses of the younger and older children were compared. However, the aphasic group showed responses which differed significantly when the younger portion of the group was compared with the older one. Part III, which involved arranging three cards in sequential order, was highly successful in differentiating between the two diagnostic groups. The most obvious behavior difference noted in the two groups was the heterogeneous behavior exhibited by the aphasic group, as contrasted with the more homogeneous behavior of the deaf group. Thus it appears that, as this test measures inner language, the two diagnostic groups do differ in their abilities: The three parts of the test differentiate between the deaf and aphasic groups with varying degrees of effectiveness. Further study appears warranted.

S 10—STUTTERING: THE INITIAL INTERVIEW

Exploratory Interview with a Young Adult Stutterer Based on A Self-Theory of Stuttering. **Albert T. Murphy, Boston University, Kinescope, University of Wisconsin, July 7, 1959.** — This brief, exploratory interview is based on the assumptions which follow. While the seeds of stuttering behavior are imbedded in the soil of early socialization experiences, stuttering's taproots are intertwined most intimately with parent-child (especially, mother-child) relationships. When nonverbal or verbal communicative or developmental breakdowns germinate in these processes, the resulting disruptions to self-perception, differentiation and integration are experienced by the child as feelings of apprehension or dread having no objective referrants (*anxiety*). These anxieties may occur in relation to specific verbal or nonverbal developmental tasks but, through generalization and similar learning occurrences, become attached to other developmental tasks, both motor and perceptual. When the strain of attempting to integrate the competing forces – of expressing or repressing feelings and thoughts – becomes too great, a self-disintegration in the form of a self-defensive, oral symptom occurs which is called stuttering. Although the stuttering symptom persists primarily as a consequence of anxiety, in time, the person may come to have specific fears (conscious-awareness) which may confuse and intensify the stuttering dynamics. If and when one of these specific fears becomes a fear of stuttering *per se*, attention on and attempts to control the stuttering symptom occur ("secondary stuttering"). In time, if the anxiety-determinants become resolved, the symptom of their presence – the stuttering – will subside; this improvement will be facilitated by self-insight concerning specific fear processes. The longer a stuttering symptom is in existence, however, the more the stuttering speech becomes self-perpetuating because of a complex combination of determinants of effects: (a) its "rewarding" nature; (b) its attention-getting and "scapegoat" benefits; (c) its satisfaction as a familiar, thus comfortable, self-ingredient; (d) as an "overlearned" and perseverative activity, and (e) because of other secondary gains such as aggression-satisfaction and even self-punishment and need for societal disapproval. All of these may be in addition to and quite aside from anxiety-promptings. The stuttering symptom intensifies or decreases as a function of variables such as the following: (a) degree of anxiety or inner discomfort; (b) feelings of doubt, confusion or hesitancy; (c) reality of perception of self and environment; (d) rigidity or pliability of total behavior; (e) social interaction or withdrawal; (f) tolerance of actions of others and of our basic impulses; (g) dependency or independency.

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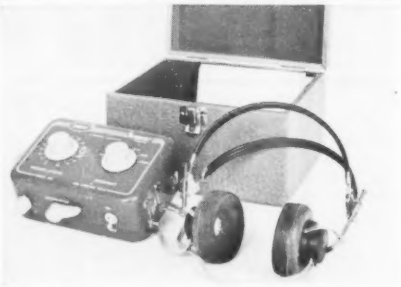

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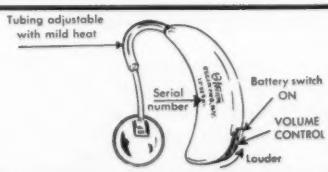

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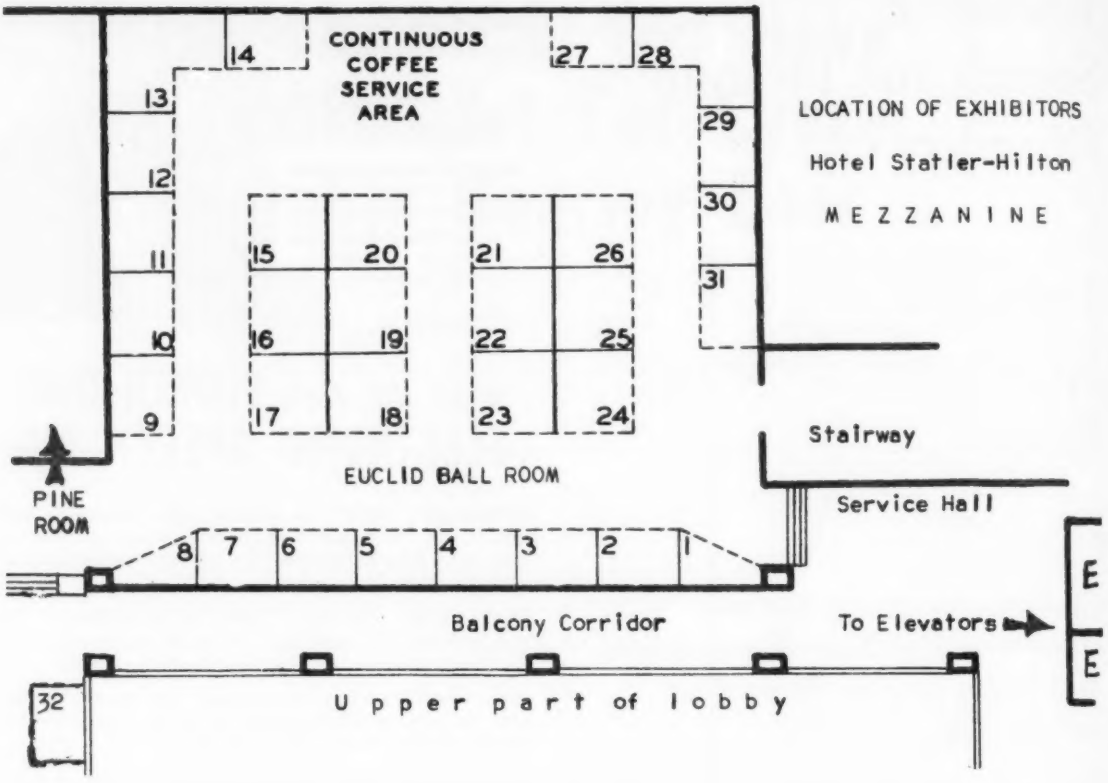

National Society for Crippled Children and Adults, Inc., Chicago, Illinois **Booth 1**

New publications for parents and professional persons. One of them is Eugene McDonald's pamphlet on Cleft Palate, for parents. Another is by Oliver Bloodstein on Stuttering, for professional people. We are also featuring Dr. Wendell Johnson's pamphlet, "Toward Understanding Stuttering," for parents, and including a new monograph on aphasia by Nancy Wood.

Expression Company, Publishers
Magnolia, Massachusetts **Booth 2**

Material on Speech Improvement, Speech Correction, Speech Therapy and Choral Speaking.

Willson Products Division—Ray-O-Vac Company
Reading, Pennsylvania **Booth 3**

Willson Sound Barriers — ear muff type sound protection against high-level noise. Featuring fluid-filled, replaceable, plastic ear cushions that provide outstanding attenuation with complete comfort. Available with or without communications equipment. Recommended for noise hazards encountered by both industry workers and the military.

Veterans Administration
Washington, D. C. **Booth 4**

The Veterans Administration Audiology is a demonstration of a refinement of two tests for non-organic hearing loss: (a) the delayed sidetone test utilizing the Grason-Stadler Speech Time Analyzer for measurement of effects, and (b) the Story Test utilizing a binaural tape deck to facilitate presentation of stimulus.

Lafayette Instrument Co.
Lafayette, Indiana **Booth 5**

We plan to display Polygraph equipment with various plug-in components for the recording of galvanometric response, respiratory functions, relative blood pressure-pulse variations, skin temperature measurements and other related pneumatic attachments . . . A delayed feed-back recorder for the inducement of artificial stuttering and accumulative timers, as well as repeat cycle timers, useful for all experimental purposes.

Hal-Hen Company
Long Island City, N. Y. **Booth 6**

Complete line of WIDEX Hearing Aids, the latest in Audiometers, the NUVOX Conversaphone, a complete line of Oto-

scopes, a complete line of Bone Conductors, approximately 300 popular accessories for the hard of hearing, and the latest in Hearing Aid Receiver Cords.

Webster Publishing Company
St. Louis, Missouri **Booth 7**

A comprehensive selection of material to aid in recognizing and correcting speech difficulties. Webster materials include texts and workbooks for the pupil's use; professional handbooks for the teacher; and speech training devices such as word wheels, flash cards, charts, filmstrips, and records, all written and prepared by recognized speech authorities.

United Cerebral Palsy Associations, Inc.
New York, N. Y. **Booth 8**

ROLE OF THE FAMILY DOCTOR IN CEREBRAL PALSY: Functions of the family medical adviser in treatment and rehabilitation of the cerebral palsied patient include working with parents, school authorities, dentists, physical, occupational and speech therapists. The aim for all professionals concerned is the providing of maximum opportunity for the patient's full participation in family, vocational and community life.

Stanwix House, Inc.
Pittsburgh, Pennsylvania **Booth 9**

The Best Speech Series. New publications by Matthews, Birch, and Phillips for "Speech Correction — Improvement and Language Development." The series consists of six nonsequential workbook type books for sounds most frequently misarticulated.

Ambco, Inc.
Los Angeles, California **Booth 10**

A complete line of DC-powered and a complete line of AC-powered Screening Audiometers, Diagnostic Audiometers and Speech Audiometers. Fully transistorized instruments will be available for your inspection and demonstration. Featured: Ambco OTOMETER; FULLY TRANSISTORIZED DIAGNOSTIC AUDIOMETERS; STEREO/BINAURAL AUDITORY TRAINER.

Jay L. Warren, Inc.
Chicago, Illinois **Booth 11**

Portable and Wearable Auditory Training Units. WARREN, PATENTED, GATED COMPRESSION INSTRUMENTS AND ACCESSORIES. Model W-1-Free field wearable auditory training unit permits the child more listening time with no change in pattern, deeper penetration, better retention, easier recall.

Otarion Listener Corporation
Ossining, New York **Booth 12**

The Listener — Otarion's eyeglass hearing aid for both air and bone conduction. The new "direct frontal hearing" Listener. The Whisperwate, small behind-the-ear aid and the Tone-o-matic, the new superpower conventional aid. The model 1000 combination puretone and speech and audiometer.

Zenith Radio Corporation—Hearing Aid Division
Chicago, Illinois **Booths 13 and 14**

The Hearing Aid Division of Zenith Radio Corporation will exhibit its highest quality, precision built audiometer. Zenith's complete line of highest quality low-cost all-transistor hearing aids will also be on display, and Zenith representatives will be on hand to demonstrate them and to explain how any physician may test a Zenith hearing aid for 30 days at no cost or obligation.

Industrial Acoustics Company, Inc.
New York, N. Y. **Booths 15 and 16(½)**

I.A.C. Series 1200 Audiometric Testing Room — the only Room of its kind made today. It is a Room within a Room with an air space between the two entirely separate housings. The inner Room floats on rubber in shear vibration isolators and the outer one rests on the area floor or, as an option, can be supplied with a floating floor.

Grason-Stadler Company, Inc.
West Concord, Massachusetts **Booths 16(½) and 17**

Equipment for audiometry, auditory training, and psychoacoustic research. The audiometric equipment includes a speech audiometer, a psychogalvanometer and a Bekesy automatic audiometer. In the wide range of psychoacoustic research apparatus are instruments for precise control and variation of auditory stimuli. Competent personnel will demonstrate the equipment and discuss its application and operation.

Chronicle Guidance Publications, Inc.
Moravia, New York **Booth 18**

Presenting "Sounds I Say," a unique approach to Teaching of Sounds for Speech Improvement and Phonic Readiness. For use in pre-Kindergarten, Kindergarten, Grades One or Two and for Special Groups. There are 72 pages in full color, wire bound, and with a gate-fold cover with cut out wheel. Plus Teachers' Manual.

Aurex Corporation
Chicago, Illinois **Booth 19**

We plan to display the "Compact" Electro-Larynx introduced this year, already proved Aurex's most important contribution to the laryngectomee; "A-400" eyeglass Hearing Aids and other Aurex instruments, each with built-in frequency and power adjustments — the basis of Aurex "Prescription Fitting."

MAICO Electronics, Inc.
Minneapolis, Minnesota **Booth 20**

Maico Audiometric Enclosures (sound-conditioned hearing test booths); Maico Audiometers and Automatic Audiometers; Maico 2-tone hearing check instruments and Maico hearing aids, both conventional, behind-the-ear, and the new Maico Hearing Glasses for men and women.

Harper & Brothers
New York, N. Y. **Booth 21**

Textbooks in speech correction and books of allied interest.

B & K Instruments, Inc.
Cleveland, Ohio **Booth 22**

Bruel & Kjaer instrumentation for testing hearing aids and audiometers. There will be a test chamber for free-field measurements, a new condenser microphone and artificial ear, an automatically tuned signal generator and recorder with test signal regulated to a constant level, and a tracking filter for automatic distortion measurements.

Acoustical Engineering Company
Houston, Texas **Booth 23**

DYNOPHONETIC — and demonstrate a method of hearing testing wherein the subject provides his own hearing product referenced to a comprehensive test formula.

Sonotone Corporation
Elmsford, New York **Booth 24**

Sonotone's new hearing aid series, unique in that there are three models—the "77," "88" and "99"—all utilizing the same chassis but enclosed in different cases accommodating one, two or four mercury cells, respectively. The maximum output levels are 125, 132, and 138. Average gains, 63, 72, and 73 db. All models include highly effective automatic volume control and extremely wide fitting flexibility.

Radioear Corporation
Canonsburg, Pennsylvania **Booth 25**

Complete Line of Radioear Hearing Aids.

Rand Development Corporation
Cleveland, Ohio **Booth 26**

The "Cooper-Rand Electronic Speech Aid," an electronic device which will provide immediate speech for Laryngectomized persons prior to mastering esophageal speech, or as a permanent voice prosthesis in cases of extensive surgery. It has also been found useful to the esophageal speaker during periods of fatigue or respiratory disorders.

Dictograph Products, Inc.
Jamaica, New York **Booths 27 and 28**

Dictograph Products, Inc., manufacturers of Acousticon Golden Circle of Sound Hearing Aids, Monarch Hearing Aids, Audiometers, and Hearing Testing Devices, Dictograph Communication Systems, Telematic and Dictomatic telephone switchboards, music distribution systems, paging systems, loud speaker voice call and private pocket-pagers, home fire alarm systems and subminiature transformers.

Beltone Hearing Aid Company
Chicago, Illinois **Booths 29 and 30**

The complete line of Beltone Hearing Aids and audiometric testing equipment will be on display. Pertinent descriptive literature will also be available for distribution.

Cleft Palate Clinic
Cleveland, Ohio **Booth 31**

Sigma Alpha Eta **Booth 32**

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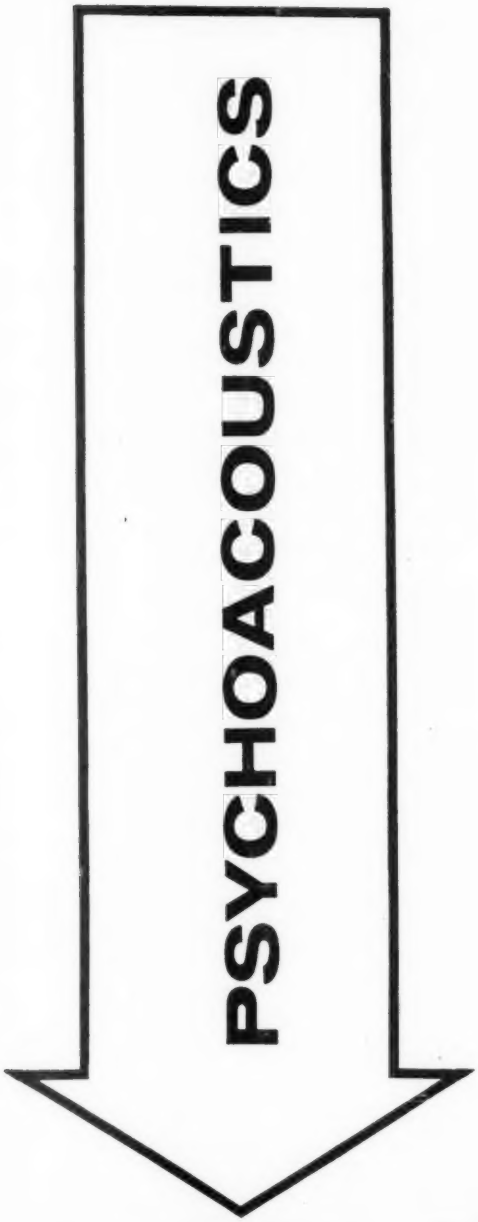

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Developed solely by the laboratories that pioneered binaural hearing among the hard of hearing, this new instrument is different from any other training aid because it provides:

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Further, this new Beltone instrument does *not* require that the teacher speak into a microphone mounted on a desk. Instead, the teacher can move about at will and the receivers on the pupils' hearing aids will pick up the voice.

The price of Beltone's binaural training aid is $249.50, which includes 2 training aids with adjustable headbands, 2 cords, 2 receivers, and 2 batteries. For complete factual information, simply mail us the coupon for a free, fully illustrated brochure. No obligation.

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